

**SECTION FOUR**

**STUDY OF MALE KORO CASES**

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## CLINICAL PICTURE OF MALE KORO CASES

### Summary

Analysis of 276 male Koro cases of North Bengal Koro epidemic shows that tobacco smoking (30%) and history of illness/operation or disease affecting the genital organs (63.4%) are quite prevalent. Analysis of clinical profile of 101 cases evinces that acute onset occurred during night with predominant premonitory symptom of 'heaviness or burning inside head', physical symptom of 'palpitation' and psychological symptom of 'fear of impending death' being the common associates with genital symptom of penile retraction. Cases with premonitory symptoms show significant association of physical symptoms like choking sensation in the throat, increased body heat, breathlessness and abdominal pain during Koro attack. Relapse rate in Koro is virtually negligible.

Though penile retraction and associated acute anxiety is regarded as the cardinal Koro presentation (Yap, 1965a), the presence of myriad symptomatology has been reported in Koro cases (Rin 1965; Gwee, 1969). In standard psychiatry text books only acute anxiety and the phenomenon of penile retraction are mentioned. A careful analysis of cases of the North Bengal epidemic evinced a mixture of different categories of symptoms, viz. physical, mental and genital. Pre-morbid history of illness and addictions also showed the presence of multiple pathologies, which may have some bearing on the patients' personality and vulnerability for Koro.

### **MATERIALS AND METHOD**

A total of 276 male Koro cases (130 from Darjeeling; 48 from Jalpaiguri, 93 from Koch-Bihar and 5 from West Dinajpore Districts) were interviewed in hospitals, private clinics and

on community visits during the epidemic of Koro in the North Bengal region. Habit, addiction (past three months) and history of past illness/operations were recorded in a clinical history format during these interviews.

A detailed analysis of clinical characteristics of Koro attack was done for 101 cases, of which 64 (23.2%) were examined during their Koro attack and 37 (13.4%) within 24-72 hours of the attack. Fig.1-5 is showing some profile of few of the male cases.

### RESULTS AND DISCUSSION

Table 1 shows the profile of habit and addiction of the Koro cases. Tobacco chewing was recorded the highest (30.4%), followed by betal leaf chewing (23.2%) and tobacco smoking (21.4%). Alcohol addiction (16.7%) and ganja (Cannabis) smoking (6.5%) was also noted. Gambling with either cards or number books was also recorded in 3.9% of cases, all of whom were urban slum dwellers.

**Table 1.** Habit and addiction (last 3 months) of male Koro cases (n=276).

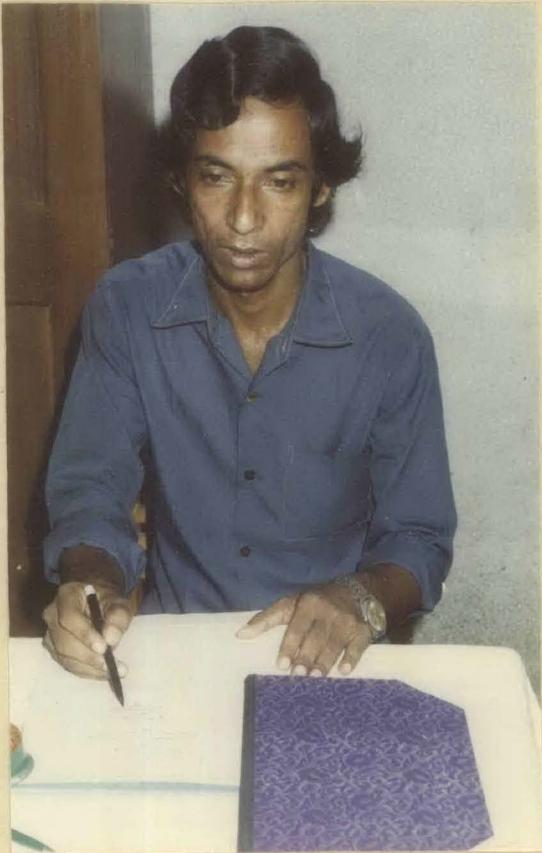
	<u>Number(%)</u>
Tobacco Chewing	84 (30.4)
Tobacco Smoking (10-20 bidi/cigarette per day)	59 (21.4)
Betal leaf (5-10 leaves/day)	64 (23.2)
Ganja Smoking	18 (6.5)
Alcohol :	
Occasional	34 (12.3)
Regular	12 (4.3)
Total :	<u>46 (16.7)</u>
Gambling	<u>11 (3.9)</u>

The history of past illness and operations (Table 2) reveal an interesting clinical spectrum. Diseases affecting the genital

**MALE KORO CASES : PHOTO NOTES**

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1. Patient with highest general education (MA in English, MA in Economics) in the series.
2. Patient of highest age (54 years).
3. A decorative patient, with golden chain, copper bangle and two finger rings.
4. Professor S. Hui is demonstrating 'no penis length abnormality' after Koro to a penis-size concerned patient - five days after his Koro attack.
5. Patients with highly anxious look - within an hour of Koro attack.



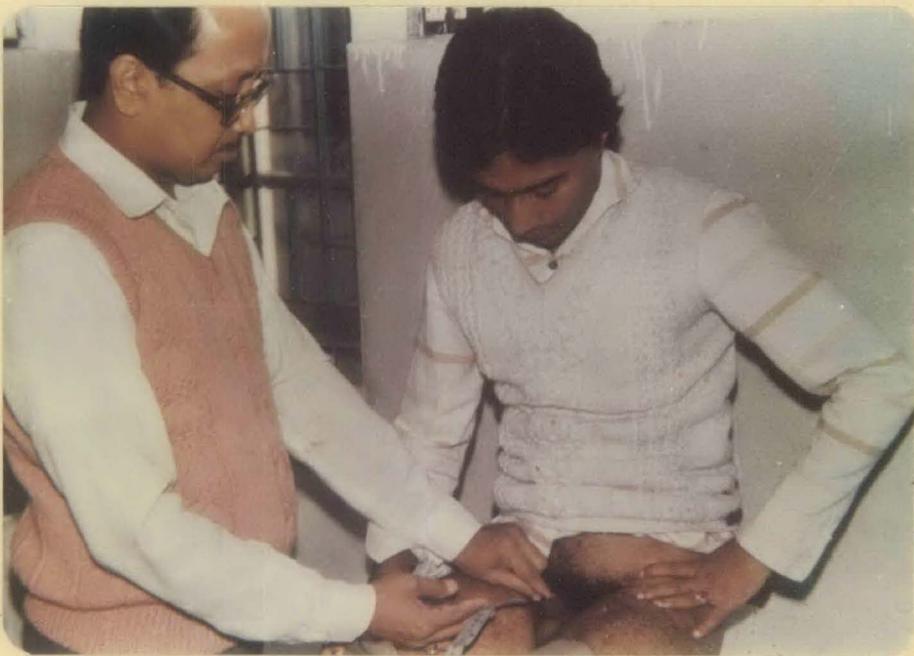
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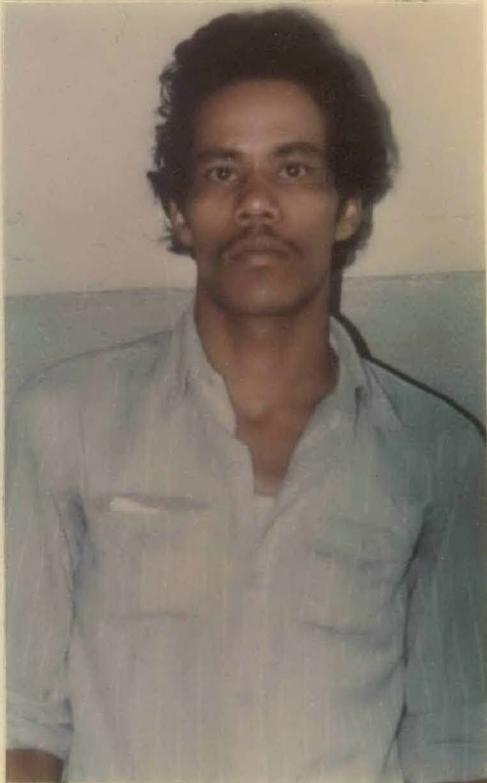
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area or organs were quite prevalent, viz. phimosis (8.7%); venereal diseases (14.9%); scrotal filaria (13.8%); hydrocele (11.2%); vasectomy (10.9%) and pyymosis operation (3.9%). The diagnosis of pulmonary tuberculosis (3.3%) and of malaria fever (10.1%) were done by medical specialists - such patients received treatment and were cured. The psychiatric diagnoses were similarly done by psychiatrists and the patients received psychotropic medicines. Two cases of epilepsy were diagnosed by medical specialists and both were on antiepileptic medications in the past. One of these attempted suicide by hanging and was admitted to hospital.

**Table 2.** Past history of illness and operations of male Koro cases (n=276)

	<u>Number (%)</u>
Phimosis present	24 (8.7)
Phimosis operated	11 (3.9)
Venereal diseases	41 (14.9)
Epilepsy (G-M type)	4 (1.5)
Filariasis :	
Scrotum	38 (13.8)
Legs	<u>6 (2.2)</u>
Total :	<u>44 (15.9)</u>
Hydrocele	31 (11.2)
Pulmonary tuberculosis	9 (3.3)
Malaria Fever	28 (10.1)
Lepromatous patch	2 (0.7)
Schizophrenia	6 (2.2)
Manic-Depressive disorder	2 (0.7)
Depression	1 (0.4)
Vasectomy done	30 (10.9)
Appendesectomy	8 (2.9)
Attempted suicide	1 (0.4)

**CLINICAL PICTURE (n=101)**

1. **Onset Type** : Acute onset was the commonest mode of presentation (86%). A few cases also showed sub-acute onset with a short premonitory period.
2. **Onset Time** : The commonest onset time was mid or late night (Table 3). This night-prone Koro attack ( $P < .01$ ) is important and may have some psychoanalytical significance.

**Table 3.** Distribution of Koro onset time.

Time	Number (%)
6 am - 12 noon	15 (14.8)
12 noon - 6 pm	12 (11.9)
6 pm - 12 midnight	33 (32.7)
12 midnight - 6 am	41 (40.6)

3. **Place and situation of Koro attack** : Though the majority (60.4%) of attacks occurred in the sheltered environment of patients' residence, varieties of situations and places have been observed, e.g. in the agricultural field while working (5.9%); in the tea garden while plucking tea leaves (5.9%); in the market (4.9%); during an attempt at sexual intercourse either with wife at home (3.9%) or with a prostitute in her hut (3.9%) or with an illegal partner in a jungle (0.9%); in the pond or river while fishing or bathing (1.9%); in the playground while playing (1.9%); in the cinema hall (0.9%); in the cow-shed during milking (0.9%) and during a ceremonial get together (5.9%).
4. **Duration of attack** : Koro is a short-lived episodic acute attack similar to panic attack. A careful analysis of duration of Koro attack, i.e., the time interval from the point of perception of penile retraction/shrinkage upto the feeling of normal reposition of penis, in 64 cases has shown it to be  $30 \pm 10$  minutes, with a range from 5 minutes to 3 hours. Dutta et al. (1982) also found a similar range of 5 minutes to 5 hours, average 25 minutes, in the Assam Koro epidemic.

5. **Clinical Symptoms** : This is divided into four categories as follows :-

A. Premonitory symptoms : Table 4 shows eight types of perceptible distress prior to the Koro attack, felt by 66.3% of the cases. 'Heaviness' or 'burning inside the head' was the commonest symptom (77.6%), followed by 'breathlessness' (64.2%) and 'lower abdominal pain' (55.2%). On the basis of premonitory symptoms the cases were grouped into two; those who did (66%) and did not (34%) show symptoms. A comparison of main symptoms (physical, mental and genital) of koro was done by Z score analysis, to see whether there is any difference in these symptoms between the groups.

**Table 4.** Distribution of Koro premonitory symptoms(n=67).

Symptoms	No. (%)*
1. Heaviness/Burning inside head	52 (77.6)
2. Breathlessness	43 (64.2)
3. Lower abdominal pain	37 (55.2)
4. Difficulty in micturation	36 (53.7)
5. Uneasy feeling	31 (46.3)
6. Apprehension/fearfulness	29 (43.3)
7. Loss of sensation in penis	17 (25.4)
8. Sleeplessness	6 (8.9)

\* More than one symptoms present in some cases.

B. Physical symptoms with Koro : Table 5 shows the distribution and comparison of ten physical symptoms associated with the koro attack between the groups. Cases with history of premonitory symptoms showed significant ( $P < .05$ ) excess of four symptoms. viz. choked throat sensation, increased body heat, breathlessness and abdominal pain, compared to those without such histories.

Table 5. Physical symptoms with Koro.

Symptoms	With Premonitory Symptoms (n=67)		Without Premonitory Symptoms (n=34)		Z score	Total %
	No.	%	No.	%		
1. Palpitation	59	88.06	25	73.53	1.71	83.2
2. Choked-throat sensation	61	91.05	15	44.12	5.10*	75.2
3. Increased body heat	38	56.72	30	88.24	3.858*	67.3
4. Breathlessness	51	76.12	13	38.24	3.85*	63.4
5. Lower abdominal pain	48	71.64	9	26.47	4.83*	56.4
6. Difficulty in articulation	37	55.22	14	41.18	1.35	50.5
7. Muscular weakness	23	34.33	9	26.47	0.82	31.7
8. Restlessness	18	26.87	8	23.53	0.37	26.7
9. Nausea/vomiting	11	16.42	4	11.76	0.65	14.9
10. Fainting	9	13.43	5	14.71	0.17	13.9

More than one symptoms present in some cases.

\*  $P < 0.05$

Maximum frequency percentage distribution of the symptoms was palpitation (83.2%) followed by choked throat sensation (75.2%), increased body heat (67.3%) and breathlessness (63.4%).

C. Mental symptoms with Koro : Table 6 shows the distribution of six types of reported mental symptoms. No significant variation in relation to the presence of premonitory symptoms was found. 'Fear of impending death' (from hyperinvolved penis) was the commonest association (87%), followed by 'fear of damage of sex organ' (loss of sexual power) in 65%. Fear of nonspecific danger e.g. heart trouble or 'something bursting inside the abdomen' was also noted in 23% of cases. An altered perception of the environment (19%) was mainly found in those patients who had their attack outside the home setting (e.g. on the field, during fishing, while urinating on the road side, on the way to school) and this was described as a sudden experience of strange feeling of changed surroundings. This phenomenon was mostly associated with the experience of hearing an odd or unclear monosyllabic sound (17%) just prior to their attack. Many patients (mostly from Koch Bihar district) articulated this fear - arousing sound by the syntax of "Kottash". It is interesting to note at this point that the 'Kattow' is the local syntax for small tortoise of river beds. It may be recalled that the origin of the term 'Koro' itself was linked to a Malay lexical term 'Kuru' or 'Keruk' and in Malay-Indonesian dialects tortoise is known by the term 'Kura' or Kura-kura' and in Macassarese language by 'Koereo' (Edwards, 1984). Both the Indonesian and Chinese people use the tortoise head as a symbol for the glans penis. Koro illness was locally identified by the term 'Kattaw' in Koch Bihar district ! Among the patients who complained of 'being chased or talked about' (6%) one had the concomitant diagnosis of schizophrenia.

D. Genital symptoms : Table 7 shows the distribution of genital symptoms. No differences were noted between the two

**Table 6. Distribution of mental symptoms (n=101)**

Symptoms*	No.	%
1. Fears of impending death	88	87.1
2. Fears of damage of sex organ	66	65.3
3. Fears of nonspecific physical danger	23	22.8
4. Feeling of altered perception of the world around	19	18.8
5. Hearing odd sounds	17	16.8
6. Feeling of being chased or talked about	6	5.9

\* More than one symptoms present in the cases.

**Table 7. Distribution of genital symptoms ( n=101 ).**

Symptoms	No.	%
1. Penile retraction only	79	78.2
2. Alteration of penile shape with retraction	9	8.9
3. Loss of penile muscular tone with retraction	6	5.9
4. Complete loss of penile sensation only	4	3.9
5. Shortening of penis length without retraction	3	2.9

Koro groups. Though the retracting penis was the cardinal presentation (78%), in the present series two other Koro-equivalent features without penile retraction were noted, viz., complete loss of penile sensation (3.9%) and shortening of penis without retraction (2.9%). Two associated symptoms of retracting penis, viz. alteration of penis morphology (8.9%) (reduced glans, reduced penis-shaft girth), and loss of penile muscular tone (5.9%) were also reported.

6. Attack Frequency : Customarily Koro is characterised by a solitary attack. An analysis of 357 male Koro cases here revealed that quite a large number of cases did have more than one attack within a single spell, usually interspersed with 15-30 minute intervals. Table 8 shows that 63.3% had single, 21.9% had two, 12.3% had three and 2.5% had four attacks within a period of 1-3 days.

**Table 8.** Koro attack frequency in males (n=357).

Frequency	No. (%)
Single attack	226 (63.3)
Two attacks	78 (21.9)
Three attacks	44 (12.3)
Four or more attacks	9 (2.5)

Ngui (1969) noted very similar attack frequencies in 220 male cases of the Singapore epidemic, e.g. single attack in 81.4%, two attacks in 8.2% and more than two in 10.5% of cases.

A clinical severity gradation of Koro intensity on the basis of attack frequencies may be helpful in research methodology. The rating of clinical severity may be done as; mild (solitary attack); moderate (two attacks) and marked (more than two attacks).

7. **Relapse** : Koro is a benign disease so far as the recurrence is concerned. All Koro researchers also note that the relapse frequency in Koro is virtually nil. One year followup of 101 cases of this series revealed relapse in two patients only one after a gap of four weeks from the first attack and the other after 19 days.

### CONCLUSIONS

This analysis reveals that the hallmark of Koro symptoms, i.e. the penile retraction with fear of death, is also associated with different types of symptomatology, many of which have not been reported earlier. The presence of premonitory symptoms, mostly reflecting neurotic anxiety indicates a significant contribution to the development of some of the associated physical symptoms in Koro. Shortening of penis without intra-abdominal retraction may also be found in an epidemic setting and needs careful notice for its proper diagnostic labelling.

## TRAIT ANXIETY PROFILE OF KORO PATIENTS

### SUMMARY

Koro is regarded as a psychogenic acute anxiety reaction since last forty years. In spite of quite a few research publications on koro during last twenty years, no report on psychometric assessment of anxiety level in Koro is available to substantiate this diagnostic status. The present study in this context is the first attempt of psychometric measurement of anxiety proneness or trait anxiety level in Koro patients. Trait anxiety measurement of 186 male Koro patients showed the presence of higher level of trait anxiety in Koro than the normal subjects.

The nosological debate over Koro's psychiatric status remains a perplexing enigma since long. Strong (1945) first suggested Koro as a form of 'anxiety neurosis'. Subsequently many researchers used the anxiety-dynamics to explain the genesis and diagnostification of Koro psychopathology by using different terminologies, eg., sexual neurosis (MansonBhar, 1960); mass hysterical delusion with panic reaction (Gwee, 1968); culture bound psychogenic reaction (Ngui, 1969; Harrington, 1982); dissemination of castration anxiety (Bourgeois, 1968); acute panic reaction with fears of social stability (Sunwanlert and Coates, 1978) or social tensions (Hes and Nassi, 1977); hypochondriacal stress response (Rosenthal and Rosenthal, 1982) or simply acute anxiety reaction (Ifabumuyi and Rweegellera, 1979; Chakraborty, 1982; Berrios and Morley, 1984). The authors who viewed Koro as a psychotic breakdown state, also ascertained the presence of high anxiety in Koro patients (Yap, 1965a; Ang and Weller, 1984). Though the source of this anxiety is discussed and elaborated by different psychoanalytical assumptions, there is not a single study reported so far that assessed psychometrically the anxiety proneness of the Koro patients.

Manifestations of clinical anxiety is suggestive of the presence of an anxiety-proneness disposition of a person, which in trait psychology is called "Trait Anxiety" (TA) and this TA is

regarded as a stable personality dimension of a person (Spielberger et al., 1970). If the anxiety dynamics has to play the central role in Koro psychopathology, then the Koro patients should have a higher TA level than the normal persons. The present study was thus designed for the psychometric measurement of TA of Koro patients in relation to normal persons and anxiety neurotics.

## **MATERIAL AND METHODS**

**Study Population :** A total of 186 male Koro patients were taken from the North Bengal Koro Epidemic (West Bengal State) cases (Chowdhury et al., 1988) and were divided according to residence (rural 82 and urban 104) and marital status (single rural 54, urban 72 and married rural 25 and urban 32). A four-point inclusion criterion (age above 15 years, minimum education of 4th grade schooling, history of only one Koro attack and no history of Koro illness in the family) was observed in case selection.

Two control groups, each of similar size (186), matched for age, marital status and residence were taken for comparisons. The first group was of 'Normal' subjects, who had no history of overt mental illness and neither they nor any of their family members suffered from Koro. The second group was a patient control, 'Anxiety Neurosis' group (ICD 9 Code: 300.0) taken on a random basis without replacement from a matched sample frame, derived from the patient pool of an ongoing anxiety research project in the Department of Psychiatry, North Bengal Medical College and Hospital, Darjeeling. The age range of the study groups is shown in Table-1.

**Instrument :** Bengali adaptation (Chowdhury, 1989h) of the State-Trait Anxiety Inventory Form X (Spielberger et al., 1970) was used.

**Time of Koro TA Assessment :** TA assessment was done within first 48 hours of the attack. Table 2 illustrates the mean time interval in hours between the Koro attack and the TA measurement.

Statistical analysis was done by using ANOVA, appropriate to a three-way factorial design.

## **RESULTS**

Distribution of the TA score of the study population is shown in Table 3 and Fig.1.

**Table 1.** Distribution of the mean age of the groups (in years)

		Rural			Urban			Grand Total
		Single	Married	Total	Single	Married	Total	
KORO	n	57	25	82	72	32	104	186
	Mean	24.43	27.93	25.45	22.96	28.62	24.70	25.30
	s.d.	6.72	6.22	6.73	4.93	5.01	6.11	
NORMAL	Mean	25.03	27.83	25.88	22.96	28.52	24.67	25.20
	s.d.	6.87	6.12	6.75	4.98	5.03	5.60	6.15
ANXIETY NEUROSIS	Mean	25.08	27.71	25.88	22.95	28.63	24.70	25.22
	s.d.	6.82	7.29	7.03	4.92	4.99	5.57	6.27

**Table 2. Time interval (in hours) between Koro attack and TA assessment**

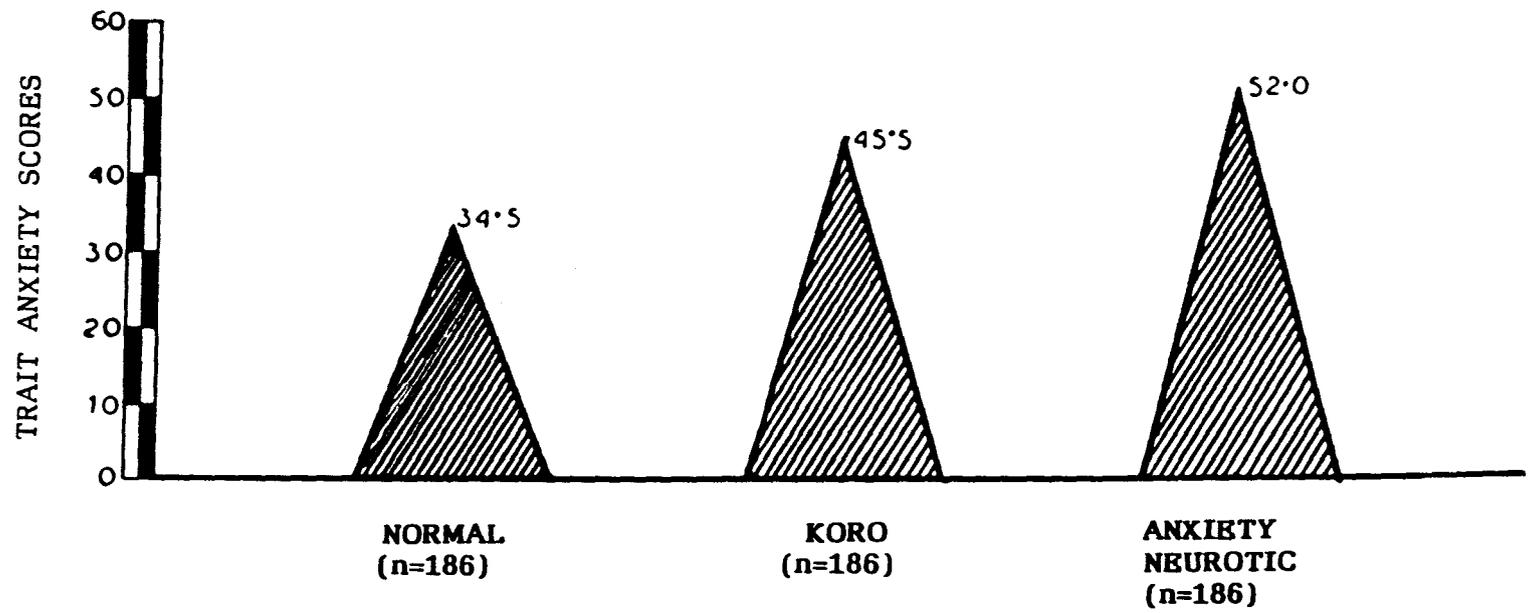
	Rural			Urban			Grand Total
	Single	Married	Total	Single	Married	Total	
Mean	27.23	28.64	27.66	31.76	23.41	29.19	28.52
s.d.	22.37	23.04	22.44	19.99	20.43	20.38	21.27

**Table 3.** Distribution of TA score of the groups by residence and marital status.

Group	R u r a l				U r b a n		Total
		Single	Married	Single	Married		
	n	57	25	72	32		
KORO	Mean	46.21	47.16	45.15	44.03	45.56	
	s.d.	6.81	6.02	2.57	3.96	4.98	
NORMAL	Mean	33.72	34.84	34.51	35.31	34.45	
	s.d.	5.47	5.70	4.78	5.31	5.19	
ANXIETY NEUROSIS	Mean	50.82	52.96	51.32	53.13	51.70	
	s.d.	6.36	5.37	4.98	4.95	5.52	

**Table 4.** Analysis of variance of TA scores.

Sources of variation	df	SSq	MSq	F	
Residence	1	5.5	5.5	0.20	NS
Marital	1	95.0	95.0	3.49	$p < .05$
Interaction	1	24.0	24.0	0.88	NS
Strata	3	124.5			
Patient group	2	28430.6	14215.3	523	$p < .001$
Interaction	6	268.4	44.7	1.64	NS
Cells	11	28823.5			
Within	546	14848.8	27.2		
<b>Total</b>	<b>557</b>	<b>43672.3</b>			



**Fig.1.** Distribution of Trait Anxiety Scores.

The statistical significance of the TA score distribution among the groups is shown in Table-4. Only two variables, i.e. patient group and marital status appeared significant. Interaction terms appeared insignificant.

## DISCUSSION

Trait anxiety level is indicative of a person's anxiety proneness personality disposition. Koro cases, both rural and urban, showed a significantly higher TA level than the normal persons. This difference in trait anxiety level of Koro patients is an important finding, which may be helpful in the explanation of their Koro vulnerability and also justifies the presence of high anxiety during the attack. Marital status by virtue of its sexual concern may have some differential effect on the Koro vulnerability.

Though the Koro patients differed in trait anxiety level from the anxiety neurotics, the position of Koro on the linear continuum of trait anxiety (from normal towards anxiety neurosis) is sufficiently closer to anxiety neurosis than to normals. The difference in the trait anxiety level between Koro and anxiety neurotics should be interpreted in the light of the fact that this level is the post-Koro trait anxiety score of the patients. The nature of their pre-Koro trait anxiety level is unknown. So it can be concluded that the Koro patients have higher level of trait anxiety than normal persons and Koro may be viewed closer to anxiety neurosis group so far the trait anxiety is concerned.

## AGE SPECIFIC TRAIT ANXIETY IN KORO PATIENTS

### SUMMARY

Analysis of Trait Anxiety (TA) scores of 69 male Koro cases according to different age groups showed that not all Koro cases displayed anxiety dimension similar to that of Anxiety Neurosis. Different diagnostic probabilities of Koro in this respect is discussed.

Koro has been identified by many researchers as atypical hysteria (Lapierre, 1972) or psychical hysteria (Gwee, 1963). The central point of these nosological attempts is related with the clinical manifestation of anxiety in Koro. Chowdhury (1990b) found a mid-position of Koro patients in between normal subjects and patients of anxiety neurosis so far as the trait anxiety level is concerned. Moreover, it is an interesting clinical impression, noted by many Koro researchers (Gwee, 1968; Ngui, 1969) that not all Koro patients exhibit acute anxiety reaction during their Koro attack. This overt or state anxiety projection is related to their covert or trait anxiety disposition. So it is a matter of clinical concern to see how many Koro patients really have trait anxiety level similar or dissimilar to those of anxiety neurotics, which being the standard referential psychopathology so far as the expression of both state and trait anxiety are concerned.

The observation of differential manifestation of anxiety in Koro in different age groups prompted this study to explore whether there exists any age specific anxiety relation in Koro specially in comparison to that of anxiety neurotics because this in turn will help to determine the nosological position of Koro as a special form of sexual neurosis.

### METHOD

1. Sample :

Koro sample, A total of 69 Koro cases (48 single, 21 married)

were taken from the North Bengal Koro epidemic (Chowdhury et al., 1988) for this study. A four point inclusion criterion (age range 16-40 years; minimum education of 4th grade schooling; history of solitary Koro attack and no history of Koro illness in the family) was observed in the case selection.

Control sample : A patient control of 167 (84 single; 83 married) anxiety neurosis cases (ICD 9 Code 300.0) of the same age range was taken from the five year data pool of an anxiety research programme of the Department of Psychiatry, North Bengal Medical College and Hospital, Darjeeling.

## 2. Instrument

Bengali adaptation (Chowdhury, 1989h) of the State-Trait Anxiety Inventory, Form X (Spielberger et al., 1970) was used.

3. Time of TA assessment of Koro patients. Trait anxiety was assessed within 7-21 days after the Koro attack, the mean being  $13 \pm 3$  days in single and  $14 \pm 2$  days in Married cases.
4. Statistical analysis of data was done by using the 'student's t' test.

## RESULTS

Table 1 depicts the TA scores of the Koro patients according to age groups and marital status. The highest TA scores in the single patients (49.8) were in the age range of 16-20 years and in the married patients (48) these were in the age range of 31-35 years.

Comparison of TA scores of single Koro patients with those of anxiety neurosis group are illustrated in Table 2. TA scores in the age range of 16-20 and 31-35 years showed no significant difference between Koro and anxiety neurotics whereas TA scores of Koro patients in the 26-30 years age range was significantly

**Table 1. TA Scores of Koro patients**

Age Group in year	SINGLE (48)			MARRIED (21)			TOTAL (69)		
	N	X	Sd	N	X	Sd	N	X	Sd
16 - 20	10	49.8	6.78	-	-	-	10	49.8	6.78
21 - 25	20	46.8	7.59	6	44.33	6.05	26	46.23	7.23
26 - 30	13	42.9	3.53	9	43.3	4.88	22	43.1	4.03
31 - 35	5	49.0	8.75	3	48.0	11.53	8	48.6	9.14
36 - 40	-	-	-	3	43.3	4.09	3	43.3	4.09

**Table 2.** Comparisons of TA scores of Single Koro and Anxiety Neurotics.

Age Group in Year	KORO (48)			ANXIETY NEUROTIC (84)			t (df)
	N	X	Sd	N	X	Sd	
16 - 20	10	49.8	6.78	16	51.8	7.09	0.72 (24)#
21 - 25	20	46.8	7.59	24	49.1	5.0	1.22 (42)#
26 - 30	13	42.9	3.53	30	52.9	5.39	6.17 (41)*
31 - 35	5	49.0	8.75	14	48.6	3.92	-0.15 (17)#

# Not significant; \*  $P < 0.001$ .

( $P < 0.001$ ) lower than those of anxiety neurosis patients.

Comparisons of TA scores of married Koro patients with those of anxiety neurotics is shown in Table 3. The TA scores of Koro patients in the lower age groups i.e. 21-25 ( $P = 0.01$ ) and 26-30 ( $P = 0.001$ ) years differed significantly from those of anxiety neurotics whereas in the higher age groups i.e. 31-35 and 36-40 years both the groups showed identical TA levels.

#### DISCUSSION

By definition Koro is an acute anxiety reaction arising as a response to the perception of penile retraction into the abdomen. But the nature and extent of the anxiety profile is not always similar to the dimension of anxiety neurosis cases, many Koro cases even display penile symptomatology without any overt anxiety at all. This observation is probably at the root of postulations of Koro as a form of auto or hetero-suggested hysterical reaction (Gwee, 1963) or somatization of cultural beliefs (Ngui, 1969). Using a clinical diagnostic tool Chowdhury (1990a) found a hysteria diagnosis in 35 per cent of Koro cases. He also noted an interesting diagnostic relationship with the severity of Koro, as determined by the number of attacks. In the mild form (solitary Koro attack) hysteria diagnosis was more frequent than anxiety neurosis diagnosis (46.4% in contrast to 14.3%) while in the severe form (more than two Koro attacks) a diagnosis of anxiety neurosis was more common (41.2% in contrast to hysteria diagnosis in 11.8%).

There is therefore sufficient reason to believe that not all Koro cases are presented with the classical symptom of acute anxiety. There are cases in which the genital retraction symptom only subserves the purpose of hysterical attention seeking without any overt anxiety reaction. This contention is supported by the findings of the present study where single Koro patients in the age range of 26-30 years and married Koro patients of 21-30 years do have an anxiety proneness personality disposition (trait anxiety) quite different from that of the anxiety neurotics. Koro patients of other age groups, on the other hand, have identical trait anxiety profile with that of anxiety neurosis group.

**Table 3.** Comparison of TA scores of Married Koro and Anxiety Neurotics.

Age Group in Year	KORO (21)			ANXIETY NEUROTIC (83)			t (df)
	N	X	Sd	N	X	Sd	
21 - 25	6	44.3	6.05	16	50.6	3.91	2.87 (20)*
26 - 30	9	43.3	4.88	27	53.2	5.20	5.01 (34)**
31 - 35	3	48.0	11.53	22	47.8	3.0	-0.07 (23)#
36 - 40	3	43.3	4.09	18	46.8	4.41	1.28 (19)#

\*  $P < 0.01$ ; \*\*  $P < 0.001$ ; # Not significant.

## PERSONALITY PROFILE OF KORO PATIENTS

### SUMMARY

Personality dimension of 49 male Koro patients of North Bengal Koro epidemic was assessed by Eysenck's Personality Questionnaire. Koro patients displayed the profile of a combination of high neuroticism and extraversion score on EPQ.

Though the World medical press has evidenced more than a dozen of Koro epidemics and over hundred Koro case reportings, still there is not a single reporting about the personality profile of Koro patients. Clinically the cases are usually designated as anxiety neurosis or hysterical reactions, yet the psychometric evaluation in support of these diagnostic contentions is still lacking. Knight et al. (1965) by using Rorschach's test and MMPI showed a higher frequency of hysterical traits in cases involved in a school outbreak of mental epidemic. High neurotic score on EPI among the sufferers of psychiatric epidemic is also reported (Moss & McEvedy, 1966). The present study is designed to psychometric assessment of personality dimension of Koro patients of North Bengal Koro epidemic of West Bengal State.

### METHOD

Case Material : Sixty three male Koro cases were selected on the basis of their educational standard (minimum being of Xth grade schooling). The response of 49 cases is discussed here as others refused to participate in the study or complete the testing. Two control groups, matched for age, education, marital status, economic class and residence were taken for comparison. One was a patient group of 'Anxiety neurosis' (ICD 9 code : 300.0) of size 30, taken from the Psychiatry OPD of North Bengal Medical College and the other group was of 50 'Normal subjects' (reported to be free from any past or present psychiatric illness).

Instrument : Bengali adaptation (Chowdhury, 1989g) of Eysenck's Personality Questionnaire (Eysenck & Eysenck, 1975) was used.

### RESULTS

Table 1 shows that the personality dimension of Neuroticism (N) score in Koro patients differed significantly ( $p < .005$ ) from that of the normal subjects. The Extraversion (E) score of Koro patients differed significantly ( $p < .005$ ) from that of anxiety group. Psychoticism (P) score showed no difference in any of the group.

**Table 1.** Distribution of Psychoticism (P), Extraversion (E) and Neuroticism (N) scores among the groups.

		P	E	N
Koro (n 49)	$\bar{x}$	4.00	14.86	16.27
	sd	1.43	3.70	3.75
Anxiety Neurotic (n 30)	$\bar{x}$	4.27	7.03	16.30
	sd	0.91	1.52	1.33
	t	0.215	4.393*	0.009 df=77
Normal (n 50)	$\bar{x}$	3.82	12.42	8.78
	sd	1.04	2.16	1.45*
	t	0.144	0.808	2.645 df=97

\*  $p < .005$ .

### DISCUSSION

Eysenck (1972) proposed that all neurotics score highly on the personality trait of neuroticism. For this emotional disposition, a high N subject responds strongly to a wide range of stimuli which led to a variety of irrational behaviour. The dimension of extraversion differentiates the different neurotic groups. High E is positively related to general antisocial behaviour and they indulge more in aberrant sexual behaviour than the introverts (low E).

A combination of high E and N score, as the Koro patients displayed here, constitute the 'Neurotic Extraverts' group (Eysenck & Claridge, 1962). Probably this association of high E and N in Koro is responsible for their psychosexual pathology with sexual conflict and guilt (Rin, 1965) and subsequent symptom formation. Clinically significant

percentage of Koro patients showed varieties of sexual approaches with resultant accumulation of conflict and guilt over such approaches (Chowdhury, 1989e). So the Koro cases could be designated as 'Neurotic Extravert' within the Eysenckian dimensional frame of personality and this disposition also helps to explain the nosological semantics of Koro symptomatology, viz. anxiety neurosis and hysterical somatization reaction.

## PSYCHOPATHOSEXUALITY IN KORO PATIENTS

### SUMMARY

An analysis of the sexual history and psychosexual behavioural profile of 162 male Koro patients was conducted, revealing that there exists a definite positive history of aberrant sexuality and psychosexual difficulties in Koro patients in comparison to normal subjects. The present finding supports the earlier assumption regarding the role of abnormal sexuality in Koro, thus providing transcultural support for the potential role of psychosexual pathology in the genesis of Koro.

Koro is an acute anxiety state where the perception of shrinking penis (into the abdomen) associated with a panic reaction constitutes the clinical presentation. The association of abnormal sexuality and psychosexual difficulties is a long-held hypothesis regarding the genesis of Koro phenomenon. Neurotic sexual preoccupation (Manson-Bhar, 1881); sexual conflicts and anxiety (Strong, 1945); abnormality in sex-linked activity (Gwee, 1968) and dissemination of castration anxiety (Rin, 1966) - all have been implicated in one way or other as the basic psychodynamics in Koro. These sexual constructs were analyzed at the background of Chinese culture and thus lacked any cross-cultural validation. The present study was aimed at testing the hypothesis of psychosexual pathology in Indian Koro patients and was thus designed to explore their background psychosexual dynamics in terms of past sexual behaviour; sexual functioning and sex-related guilt feeling.

### METHOD

The subject : 162 male Koro patients (104 single, 58 married) of North Bengal Koro epidemic, West Bengal were studied (Chowdhury et al., 1988). The age mean of the sample was :  $25.9 \pm 6.1$  years. Sample selection was based on two criteria : (1) cases above the age of 15 years and (2) cases interviewed during the first three weeks of the epidemic only. A sample of normal subjects, marital

status matched (100 single and 60 married) was taken for comparison. The age mean was  $26.1 \pm 5.6$  years.

The instruments : Sexual History Schedule - A semistructured interview schedule was prepared to record the history of sexual behaviours and sexual functioning. The sexual behaviour part contained items like Homosexual practice; Incest; Premarital and extra-marital sex relation (for married persons); Heterosexual relation (for unmarried persons) and prostitute visit. Incest is taken as per the definition of Murdock (1949) as "participants related to one another by a real or artificial bond of kinship which is culturally regarded as a bar to sex relations". The sexual functioning section contained items like Spermatorrhoea; Orgasmic difficulties; Impotence and Weak sexual power.

Sexual Guilt Schedule - A structured forced-choice 7-item questionnaire was devised following the frame of reference of sexual behavioural pattern illustrated by Eysenck (1972) and Mosher and Cross (1971). It is a simple question format pertaining to sexual guilt probing (Appendix - 2) with a 4-point response rating scale : 0 being no guilt feeling and 1,2,3 for mild, moderate and marked guilt feeling respectively. Statistical analysis of data was conducted by binominal distribution.

### RESULTS

Table 1 depicts the profile of past sexual behaviour of Koro patients and that of normal subjects. All the sexual behavioural items showed significant excess in Koro group except 'homosexual practice' and 'pre-marital sex (for married subjects).

**Table 1.** Profile of Past Sexual Behaviour of Koro and Normal Subjects.

	KORO %	NORMAL %	P%
Homosexual practice	1.9	0.62	31.1
Incest	6.8	-	$0.41 \times 10^{-1} **$
Heterosexual relation	18.5	10.5	2.9*
Premarital sex	22.8	20.0	39.4
Extramartial sex	16.1	3.7	$0.14 \times 10^{-1} **$
Prostitute visit	43.3	6.8	$0.47 \times 10^{-12} **$

P% = Probability percentage; \*p 5%; \*\* p almost to zero.

Table 2 shows the profile of past sexual functioning of both the groups. All the four items, viz. spermatorrhoea, orgasmic difficulties, impotence and weak sexual power showed significant preponderance in the Koro patients.

**Table 2.** Profile of Past Sexual Functioning of Koro and Normal Subjects.

	KORO %	%	NORMAL P%
Spermatorrhoea	45.1	12.9	$0.94 \times 10^{-8**}$
Orgasmic difficulties	51.2	16.7	$0.27 \times 10^{-8**}$
Impotence	34.6	11.7	$0.73 \times 10^{-4**}$
Weak sexual power	54.9	9.9	$0.45 \times 10^{-16**}$

P% = Probability percentage; \*\*p = almost to zero.

Table 3 exhibits the extent in percentage of sexual guilt of the groups. Koro patients have significantly more guilt in all the three intensity categories, viz. mild, moderate and marked, with highest frequency in the 'moderate' degree of guilt feeling.

**Table 3.** Profile of Sexual Guilt in Koro and Normal Subjects.

	KORO %	%	NORMAL P%
Sex Guilt :			
Mild	16.7	5.6	$0.11^{**}$
Moderate	35.8	3.7	$0.26 \times 10^{-11**}$
Marked	22.8	2.5	$0.78 \times 10^{-6**}$
Total :	75.3	11.8	$0.42 \times 10^{-30**}$

P% = Probability percentage; \*\*p = almost to zero.

## DISCUSSION

The results of the present study suggests the potential role of background psychosexual dynamics in the genesis of Koro psychopathology. It has been seen that the Koro patients have specific sexual morbidity, insofar as their past sexual behaviour and functioning and present sexual guilt feelings are concerned in comparison to normal subjects.

Feelings of sexual inadequacy and weakness are a well known nucleus in anxiety neurosis. Findings of spermatorrhoea, orgasmic dissatisfaction, ejaculatory difficulties and concomitant impotence, sexual weakness and sexual guilt in Koro strongly favour the expression of sexual anxiety in the clinical picture of the disorder. The nature and extent of aberrant sexual-behavioural history in Koro highlights a special feature of the sexual-behavioural profile in Koro. The high association of 'incest' and 'prostitute visit' in Koro not only marks the patients' indulgence in aberrant sexuality but may also be indicative of a deep-seated confusion and anxiety related to masculinity (Rin, 1965). Moreover, homosexual practice, involvement in extramarital sex and prostitute visit indicate the Koro patients' transgression of usual social sex-norms.

These histories of significant psychosexual pathologies in Koro patients shed additional light on the psychodynamics of Koro phenomenon. Firstly, their indulgence in varieties of aberrant sexual activity is the reflection of their deficiency in the masculine self-image, which is operative in the generation of fear and anxiety, inasmuch as the integrity of sexual morphology and strength is concerned (Chowdhury, 1989 b,d). Rin (1966) has pointed out that the incompatibility between biological and psychological gender identity is the cause of this sexual deviation in them. Chowdhury (1991b) explained this multiple sexual-behavioural motivation from the standpoint of personality disposition of Koro patients, viz., a combination of high neuroticism and extraversion (on EPQ). Irrespective of the nature of the basic driving force, the result is two fold. Firstly, these multiple sex-linked behaviours, most of which are usually not self-gratifying and socially or morally overtone, generate sexual fear in terms of sexual energy potentiality and penile morphological integrity. Secondly, the generated vicious cycle of cumulative sexual guilt not only further dampens the masculine self-image

but also, in association with the cultural sexual myths and beliefs, predisposes the person to the cognition of sexual invalidism in all its emotional accompaniment. This is the psychic background upon which the cognition of penile shrinkage evolves, and is a unique symptom choice that subserves the purpose of hysterical somatization, displacement of organ anxiety and projection of guilt associated with the morbid psychosexual cognition. It also credits the positive illness paradigm at both the individual and the social levels and one is thus able to attain the cultural attention and social acceptance (Chowdhury, 1991f).

Early researchers have stressed this aspect of pathosexual cognition in the genesis of Koro symptom choice, mainly in terms of Chinese and South East Asian culture. The result of the present study, from the background of Indian culture, confirms the earlier assumption regarding the positive role of aberrant sexuality in Koro and stresses the importance of psychosexual pathology in the genesis of Koro.

## DIAGNOSTIC NOSOLOGY OF KORO

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### SUMMARY

Psychiatric diagnostic screening by MPQ was done on 60 male Koro patients. 75% of the cases were identified as having a secondary psychiatric diagnosis. Highest percentages of cases were diagnosed as hysteria (35%), followed by anxiety neurosis (21.7%), paranoid schizophrenia (11.7%) and schizophrenia (6.7%).

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### INTRODUCTION

Koro is an acute psychogenic state in which the perception of decreased penis length because of hyperinvolution from intra-abdominal traction is the main feature. The diagnostic nosology of Koro is a long-held debate in psychiatry. Some view it as a form of anxiety neurosis (Strong, 1945; Ngui, 1969); some are in the opinion that Koro is a panic reaction (Gwee, 1968; Suwanlert & Coates, 1978) or a hysterical conversion state (Gwee, 1968). Still others who consider Koro as a state of psychotic breakdown (Yap, 1965a; Harrington, 1982). Edwards (1984) recently postulated a tripartite classification of Koro as, physiological retraction, panic state and chronic somatizer. It should be noted that all these nosological description were based on the clinical impression without any psychometric diagnostic assessment. The present study is unique in this context that it has utilized a psychometric diagnostic screening for Koro cases along with a clinical severity gradation. This methodology clarifies some of the earlier confusions.

### METHOD

#### Sample

60 male Koro cases were taken by random sampling without replacement from a sample pool of 81 cases, collected from

Siliguri town, Bagdogra, and Naxalbari area of Darjeeling district (West Bengal State) during the mid-1982 North Bengal Koro epidemic. Age mean of the sample was  $22.78 \pm 4.5$  years. The cases were divided according to their severity i.e., number of Koro attacks, viz. single attack - mild (n=28), two attacks - moderate (n=15) and more than two attacks - severe (n=17).

### Tools

Multiphasic questionnaire (MPQ) of Murthy (1965) and Murthy and Lakshminarayan (1968) was used for the diagnostic screening. MPQ was administered at the first clinical contact with the cases and the range of the time interval between Koro attack and MPQ screening was from 6 hours to 3 days (mean 2 days).

Statistical treatment of the data were done by using 't' test and correlation coefficient analysis.

### RESULTS

Table 1 shows the diagnostic distribution of the Koro cases. In the mild category neurosis showed higher frequency (60.7%) with higher percentages of hysteria diagnosis (46.4%). Similar picture was observed in the moderate variety. In the severe cases, though neurosis constituted the higher frequency (52.9%), psychosis also constituted 35.3% diagnoses. 75% of the Koro cases were identified by MPQ diagnosis of which neurosis was 56.7% and psychosis 18.3%. Individual diagnostic position showed the highest percentage of hysteria (35%) followed by anxiety neurosis (21.7%), paranoid schizophrenia (11.7%) and schizophrenia (6.7%).

**Table 1** : Distribution of MPQ diagnosis of Koro Cases

Koro (in 60)	Neurosis			Psychosis		
	Anxiety No(%)	Hysteria No(%)	Total No(%)	Schizo. No.(%)	P.Schizo. No(%)	Total No(%)
Mild (n 28)	4(14.3)	13(46.4)	17(60.7)	1(3.6)	3(10.1)	4(14.3)
Moderate (n 15)	2(13.3)	6(40)	8(53.3)	-	1(6.7)	1(6.7)
Severe (n 17)	7(41.2)	2(11.8)	9(52.9)	3(17.7)	3(17.7)	6(35.3)
<b>Total</b>	<b>13(21.7)</b>	<b>21(35)</b>	<b>34(56.7)</b>	<b>4(6.7)</b>	<b>7(11.7)</b>	<b>11(18.3)</b>

Grand Total = 45(75)

Table 2 shows the correlation between the MPQ diagnosis and Koro severity. Anxiety neurosis and schizophrenia showed a positive correlation while hysteria showed a negative trend and the paranoid schizophrenia did not reveal any such trend. As a whole, neurosis displayed a negative correlation ( $r = -0.81$ ), while psychosis showed a positive trend ( $r = 0.40$ ). Only hysteria diagnosis showed significance with 10% error.

**Table 2** : Correlation between MPQ diagnosis and Koro severity

MPQ Diagnosis	Koro (Mild to Severe)		
	r	t(df)	
Anxiety	0.60	0.74(1)	
Hysteria	-0.99	-6.35(1)	$p < .01$
Schizophrenia	0.66	0.87(1)	
P.Schizophrenia	0		
Neurosis	-0.81	-1.39(1)	
Psychosis	0.40	0.43(1)	

Table 3 showed the distribution of MPQ diagnosis among the Koro cases and revealed a significant ( $p < .05$ ) deviation.

**Table 3 :** MPQ diagnostic significance among Koro patients

	Anxiety	Hysteria	Schizophrenia	P.Schizophrenia
No.(%)	13(21.7)	21(35)	4(6.7)	7(11.7)

$$\chi^2 = 8.45; \quad df = 3; \quad p < .05$$

## DISCUSSION

Pathological anxiety is the basic psychodynamic ingredient in Koro (Chowdhury, 1990b), which in its malignant form encroaches into the psychotic territory and being expressed as 'depersonalization' (Yap, 1965), or 'hysterical delusion' (Gwee, 1968) or dysmorphic penile perception (Chowdhury, 1989b). This is probably related with the severity of Koro illness. The present finding is indicative of such a relationship. In the mild form, hysteria diagnosis occupies a major share, while in the severe form this position is replaced by anxiety neurosis and schizophrenia.

The expression of anxiety and its concern with genital complaints probably manifests in tune with the cultural tone and values about Koro. So in some, it was expressed as panic attack while in others it reached the extent of loss of reality testing. One note of caution should be worth mentioning here about the psychosis diagnosis of Koro. The psychotic delusional incorporation of genital shrinkage symptom should be analysed at the background of spreading Koro remour. The weak ego-boundary or dissolved self of the psychotic may just incorporates this ongoing symptom into the fabric of his bodily delusion, rather than the Koro initiates the psychotic process. The findings

of the correlational study should be viewed with the limitations of sample size in the present study.

To conclude, Koro cases does show a significant diagnostic status, especially neurosis, so far as the MPQ screening is concerned.

## SEX-GUILT COGNITION IN THE GENESIS OF KORO

### SUMMARY

Koro is a culturally related sexual neurosis, the etiology of which is still uncertain. Review of male Koro cases from the global literature as well as the present author's research strongly endorses the hypothesis of a sex-guilt cognition as an important psychodynamic determining factor in its genesis. A detailed discussion on the model of sex-guilt cognition is discussed.

Koro is a culturally related psychogenic illness, clinically characterized by acute panic reaction concerning the perception of genital hyperinvolution and fear of impending death. In the male, the retraction/shrinkage of penis into the abdomen, and in the female shrinkage of vulval labia into the vagina and/or indrawing of nipple or breast into the chest cavity, are the cardinal features.

The etiology of Koro still remains a vexing problem in psychiatry. The early researchers, mainly from south-east Asian countries, stressed the psychoanalytical significance of cultural influence viz. concept of sexuality/morality as the budding focus of Koro perception (Gwee, 1963, 1968; Yap, 1965a; Rin, 1965; Ngui, 1969). Later, a number of sporadic Koro cases from the western world have been reported where an emphasis on physiological dysfunctions (supposed or clinically insignificant), mainly of genital nature, has been attributed as its cause. Both groups, however, positively acknowledge the role of psychosexual dynamics and its cultural constructs at the root of genital retraction symptom choice of the cases. Most of the authors pinpoint the presence of

sexual conflict and guilt in the pre-morbid history of male Koro cases.

The present paper thus attempts to explore the rationality of such sexual hypotheses in the genesis of Koro by critical analysis and theoretical postulation of this construct from the world Koro literature survey, along with the present author's research finding in this context (Koro epidemic of North Bengal, India, Chowdhury et al., 1988).

### **Evidence from the Early Researches**

Literature survey of the last fifty years has shown that at least three types of psychosexual abnormalities are noted in the male Koro cases irrespective of their origin, whether oriental or occidental.

These are :

1. Conflict and guilt over sexual activities like masturbation (Bychowsky, 1952; Baasher, 1963; Yap 1965a, b; Bourgeois, 1968; Hes & Nassi, 1977; Cremona, 1981; Chakraborty, 1982; Shukla & Mishra, 1981; Scher, 1987); heterosexual relation with wife (Modai et al., 1986; Durst & Rosca-Rebaudengo, 1988; Adityanjee & Subramaniam, 1991) or prostitute or girl friend (Rin, 1963; Gwee, 1963; Yap, 1965a; Malinick et al., 1985; Lucier, 1984-85; Scher, 1987; Bernstein & Gaw, 1990) and conflict over sexual potency (Kobler, 1948; Rosenthal & Rosenthal, 1982; Oyebode et al., 1986; Scher, 1987) and sexual maladjustment (Yap, 1965 a,b; Adityanjee & Subramaniam, 1991).
2. Inadequate masculine self-image (Yap, 1965a; Lapierre, 1972; Arbitman, 1975; Cremona, 1981; Modai et al., 1986; Scher, 1987).
3. Hypersexual behaviour and multiple sexual relations (Yap, 1965 a; Lucier, 1984-85; Malinick et al., 1985; Modai et al., 1986 ; Tseng et al., 1988).

It is also of clinical interest to note that most of the authors found premorbid neurotic personality pattern (Yap, 1965a, b; Rin, 1965; Berrios & Morley, 1984; Dutta et al, 1982; Sachdev, 1985; Tseng et al, 1992; Heyman & Fahy, 1992) or history of frank attack of acute anxiety (Barrett, 1978; Cremona, 1981; Modai et al., 1986).

A series of controlled studies of male Koro cases of North Bengal Koro epidemic were done by the present author and the salient findings are summarized as follows :

1. A host of abnormal sexual behaviours are noted in the history of Koro patients (n 162), eg. incest; extramarital sex and prostitute visit (Chowdhury, 1992g).
2. Koro patients (n 162) have more problems in sexual functioning like spermatorrhoea, impotency, orgasmic difficulties and weak sexual power than the normal subjects (Chowdhury, 1992g).
3. Koro patients (n 162) display a profile of marked sexual conflict and guilt, compared to the normal controls (Chowdhury, 1992g).
4. Personality profile on EPQ (Eysenek & Eysenek, 1975) of Koro patients (n 49) shows a significant score of Neuroticism (N) in comparison to normals and Extraversion (E) in comparison to anxiety neurotics (Chowdhury, 1991f).
5. Assessment of trait anxiety level by STAI of Spielberger et al.(1970) shows the presence of a higher level of trait anxiety in Koro patients (n 186) than that of normal subjects (Chowdhury, 1990b). Age specific trait anxiety however shows that not all Koro patients (n 69) evince a similar dimension of trait anxiety like that of anxiety neurosis cases (Chowdhury, 1993d).

6. Diagnostic screening of Koro patients (n 60) by MPQ Murthy & Lakshminarayan, 1968) shows a higher percentage of hysteria diagnosis (35) than anxiety neurosis (21.7%)(Chowdhury, 1990a).

## DISCUSSION

The following discussion is mainly devoted to the analysis of sexual conflict and guilt of Koro patients in terms of personality and anxiety dimensions. Subsequently an attempt is made towards a theoretical postulation of sex-guilt cognition as evinced from the interplay of these factors in order to account for the genesis of Koro illness in males.

### Interactions of Psycho-sexual Pathology and Personality Dimensions :

Eysnek (1960) proposed that all neurotics score highly on the personality trait of neuroticism (N) or emotionality. High N subjects for this over-emotional disposition respond strongly to a wide range of stimuli which usually lead to a variety of irrational behaviour (Eysenck, 1967; Eysenck & Eysenck, 1970). But from the sexual-behavioural point of view, high N scorers are susceptible to fear and anxiety concerning sexual exposure or encounter, especially outside the legal bonds of matrimony (Eysenck, 1970; 1971a). The high N score in Koro patients, though well-fitting with their clinical anxiety profile, contradicts the sexual-behavioural pattern of the high N scorer. On the otherhand, unlike the high N (anxious) subjects, they exhibit a high extraversion (E) score as well.

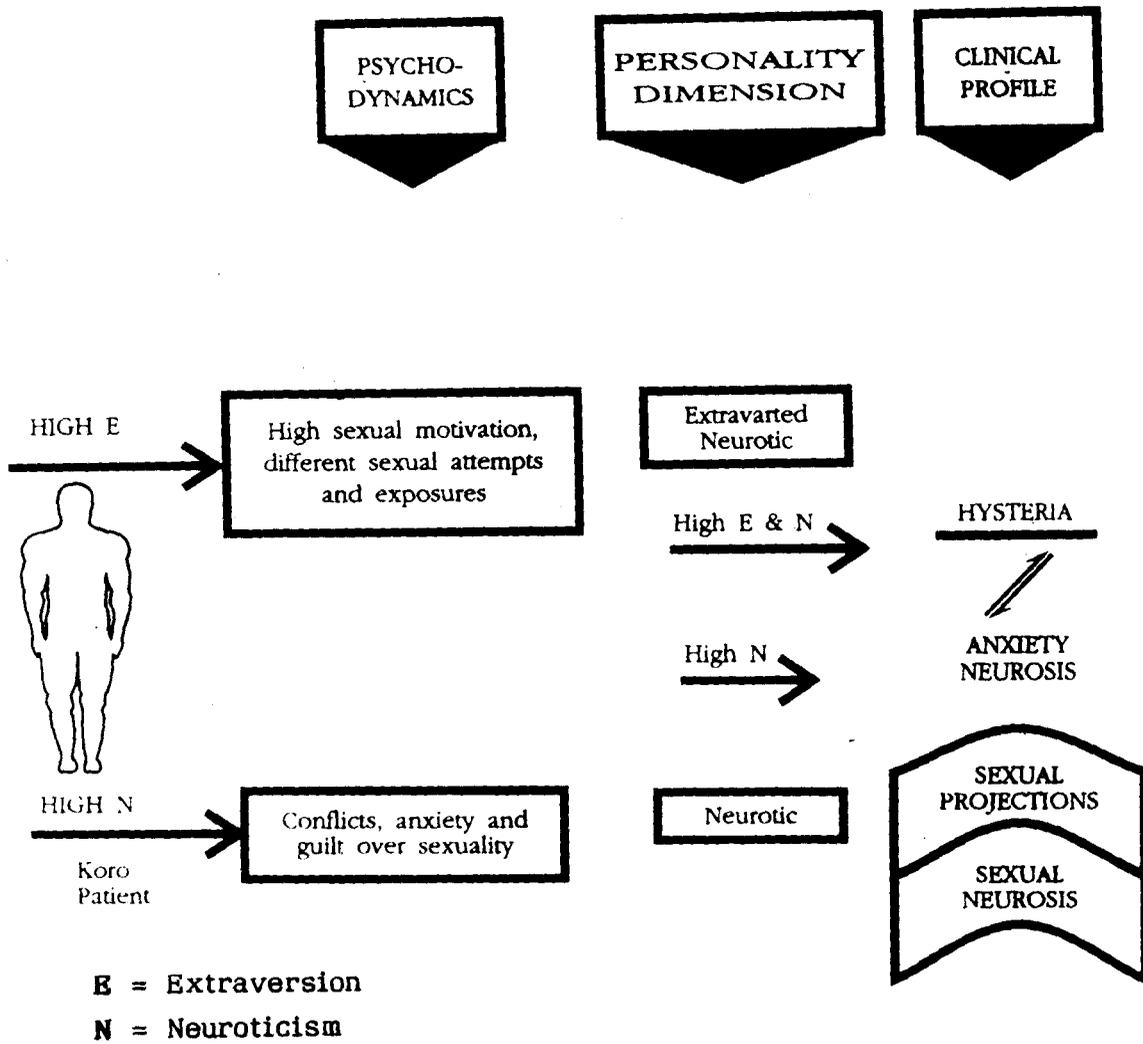
The dimension of extraversion is different in neurotic groups. High E is positively related to general antisocial behaviour and such patients indulge more in aberrant sexual behaviour than do the introverts (low E) (Eysenck, 1964; Eysenck, & Eysenck, 1970; 1971). Extraverts have intercourse earlier and more frequently, have intercourse with more different persons per unit of time and they indulge in more varied sexual behaviours than

the introverts and normals (Wells, 1969; Eyseneck, 1972).

A combination of high E and N scores, as the Koro patients display, constitutes the "Neurotic Extraverts" group (Eyseneck & Claridge, 1962). This association of extraversion and neuroticism was suggested earlier by Carl Jung, who proposed that in the case of neurotic breakdown, the patients are predisposed towards hysteria and psychasthenia. Conditioning theory also supports the postulation that an extraverted neurotic is predicted to be vulnerable to hysterical or psychopathic disorder. They fail to adopt socially appropriate conditioning (Eyseneck, 1976; 1979).

This association of high E and N is probably responsible for varied psychosexual pathologies with resultant sexual conflict and guilt, and subsequent symptom formation of Koro patients. Their high E disposition would make them react positively to sexual situations or encourage them to invite solitary or multiple sexual relations, while their coexisting high N personality component would make them react negatively to each situation. O'Neill and Kempler (1969) explain this situation by the concept of 'approach-avoidance conflict' : the N component helps to raise the 'avoidance' gradient above average and correspondingly the E component raises the 'approach' gradient above average. Psychodynamically this is a critical paradox. Clinically a high percentage of subjects may thus show varieties of sexual approach with resultant accumulation of cumulative conflict and guilt over each such 'approach' behaviour (Wells, 1969; Sevensen, 1963). Koro patients display this interaction. The clinical outcome of such an interaction so far as the psychiatric diagnosis is considered, is dependent on the individual disposition of the E component over the N component and vice versa. Thus some may manifest a behaviour akin to hysterical genital somatization while some may exhibit acute anxiety neurosis with genital focus. Both, however, may be called sexual neurosis (Fig.1).

The rational basis of this postulation lies in the fact that either many dual diagnostic labelings of Koro was assigned eg. 'hysterical panic reaction' (Gwee, 1963), conversion hysteria (Gwee,



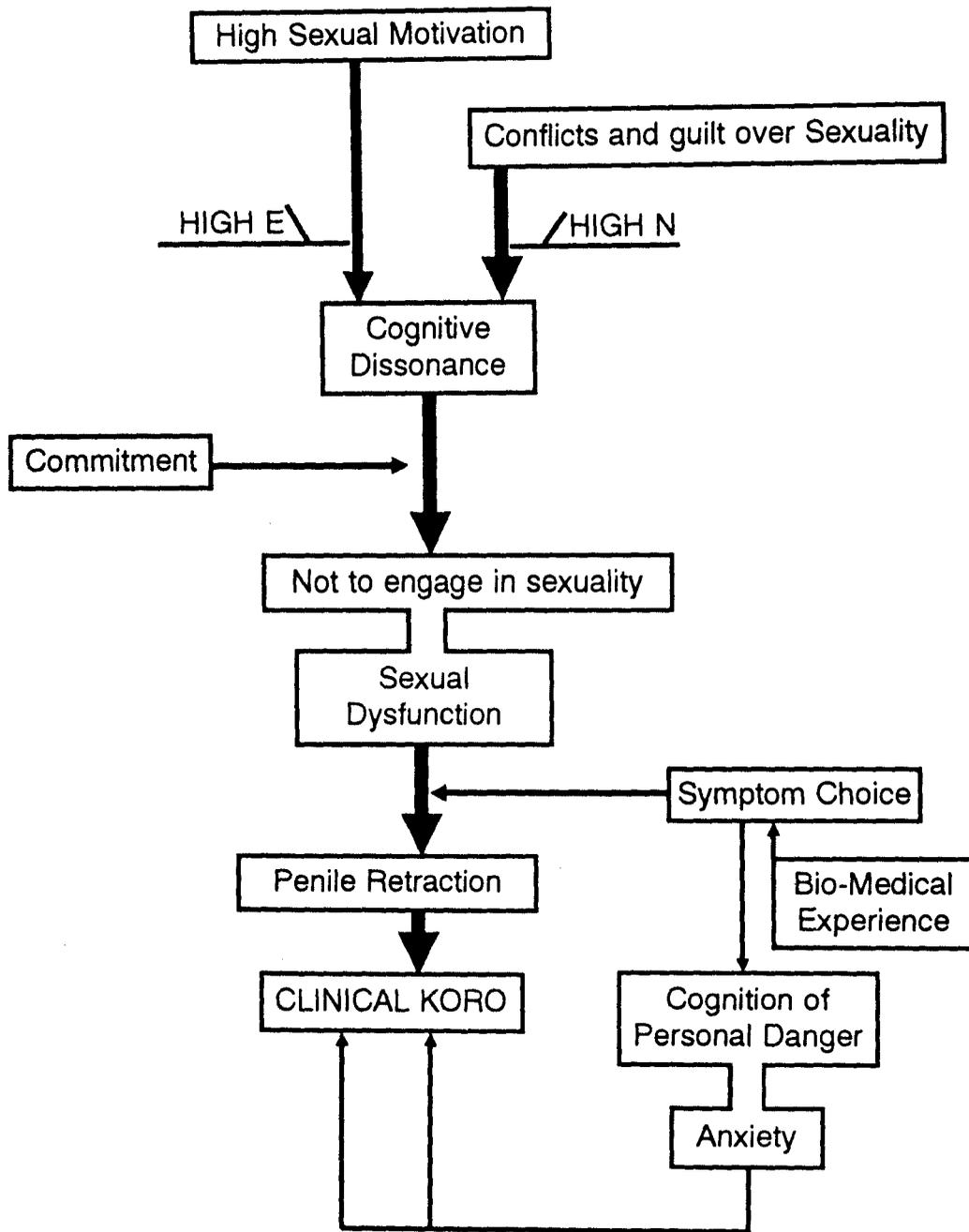
Interactions and relationship of personality factors and clinical expression in Koro.

Fig.1

1963); 'mass hysterical delusion with panic reaction' (Gwee, 1968); 'psychial hysteria' (Gwee, 1968), or a solitary diagnosis like anxiety neurosis made (Shukla & Mishra, 1981; Chakraborty, 1982). The present author's finding of a higher percentage of neurosis diagnosis (56.7%) in contrast to 18.3% psychosis among 60 Koro patients in a diagnostic screening, where in the neurosis group 35% and 21.7% yielded the diagnosis of hysteria and anxiety neurosis respectively (Chowdhury, 1990a) also supports this psychodynamic postulation. Clinical similarity of Koro with anxiety neurosis is reported in many studies. Evidently many studies report sexual conflict, guilt and sexual maladjustment in patients of anxiety neurosis or hysteria (Robins et al, 1952; Ponnudurai et al., 1981; Eysenck, 1971 b,c.). So, in view of all these findings, the Koro patient can be designated as 'Neurotic Extravert' within the Eysenckian dimensional frame of personality. From the clinical point of view Koro should therefore bear a diagnosis of sexual neurosis.

#### **Six-Guilt Cognition (Fig.2) :**

Psychoanalytically this combination of high E and N factors offers a unique background upon which a hypothesis of sex-guilt cognition in the genesis of Koro phenomenon can be outlined. Because of the outward motivation of high E the Koro patient exposes himself to a variety of sexual encounters, many of which are not ethically or culturally sanctioned by the society. Because of the high N most of such attempts are sexually unrewarding and unsatisfying which obviously in turn evoke a deep sense of sexual failure or inadequacy. Repeated attempts to prove potency or satisfy sexual urge results in successive failures and this, when combined with a sense of shame and frustration generated out of each attempt, gives rise to conflict and guilt over sexual misdeed and sexuality in general. This psychic complex gets more intensified by the high N component and ultimately, because of the sensitive and emotional character of the problem, becomes a great personal concern which occupies a major portion of the cognition about masculine-self of the subject.



**SEX-GUILT COGNITION THEORY OF KORO**

**Fig. 2**

Sex-guilt has a diverse negative influence on sexual cognition and functioning. Mosher (1966) defines sex-guilt as a tendency toward self-punishment following a transgression of social sexual standards. The development of sex-guilt is also dependent on the subjects pre-guilt cognitive resources in the perspective of the value system (sexual moral) of his culture. Pre and extra-marital sex relation, prostitute visit and adultery have moral and ethical overtone as such and such behaviours are more conducive to making a vulnerable person prone to a psychic insult of guilt and remorse (Mosher & Cross, 1971). Sex-guilt has an inhibitory influence on the cognitive-functional aspect of sexual behaviour (Gerrard & Gibbons, 1982). This cognitive inhibition is instrumental in restraining the person from overt sexual-behavioural approaches. Mosher (1966) suggests that a high-guilt subject shows a motivational or behavioural avoidance of sexual exposure because that provides less opportunity to deal with the dilemmas and conflicts associated with sexual practice, thereby attempting to minimize the quantum of sexual anxiety.

This situation in Koro resembles cognitive dissonance (Festinger, 1957). High sex-guilt and conflicts in Koro lead to the cognitive inhibition of further sexual activity, be it auto or homo or hetero-sexual in nature. This is an attempt to resolve the high N contribution, but high E dampens this cognition, thereby sharpening the conflict more acutely - creating a cognitive dissonance situation, a state very much unpleasant due to heightened anxiety and sexual-motivational ambivalence. So the question of commitment enters into the picture, which in Koro is 'not to engage in sexual act'. But because of the high E this motivational force is very weak and so the dominance of high E is again felt.

To resolve this anxiety, another mechanism is called for - a cognitive shift (similar to displacement) which attempts to offer some stability to the commitment. This shift is towards the cognition of 'sexual dysfunction' and in that the symptom choice of 'penile shirinkage' (or retraction) may serve the purpose well. If the genitalia are not in proper form or power, no question of sexual encounter arises; whereby the chance of recurrent conflicts and anxiety can be avoided. Moreover, the development

of this 'illness' is unique as far as the gratification of both F and N factors is concerned. Hysterical gratification is highly earned as the genitals are exposed and handled by others - sexual exhibitionism in overt form being nurtured, and at the same time, assurance of sexual integrity is also earned by the medical and non-medical examination and discussions.

Two important questions are to be considered at this point: (1) If this be the resolution of sexual conflicts and guilt, why did the cases display an acute anxiety reaction, in their Koro clinical profile ? and (2) why does the conflictual situation provoke a maladaptive response instead of a positive reaction, such as an analysis of the situation ?

The first question can be answered from the standpoint of high N component again. High N directs another cognitive shift, being generated from the stress inherent in the symptom, and thus colours the picture similar to an acute anxiety attack. This cognitive shift is in the direction of a new ideational component of 'personal danger' and in this respect Koro clearly mimics a panic attack. Beck et al. (1974) suggest that the amount of anxiety generated is proportional to the degree of plausibility (as to the patient) of hypothetical danger as per personal estimate of the probably of harm. The usual theme of danger is death or disability. It is this second order emotional reaction that is responsible for the clinical anxiety manifested in Koro cases even when the psychodynamic pathway follows a hysterical somatization reaction.

The second question may be viewed from the perspective of culture-dependent (defective) coping style (Cohen & Lazarus, 1979). Here, both extrinsic (socio-cultural) and intrinsic (individual personality resources) factors play a joint role. There is a lack of appraisal (cognitive process of evaluation of an event) with resultant failure of coping (the intrapsychic defence) and behavioural efforts (coping strategies) to deal with the event. Possible reasons for such a defective style are the intensity of ambivalence (a high N contribution); failure to mobilize cogni-

tive resources or inability to deal directly with the conflicting issues, or narrow or faulty cognitive span and orientation (a product of conducive cultural myths and social beliefs) that negatively interfere with the coping behaviour (Lipowski, 1970; Obeyesekere, 1969 ; Murphy, 1976; Twaddle, 1974).

## BIOMEDICAL POTENTIAL FOR SYMPTOM CHOICE IN KORO

### Summary

The distribution of different biomedical sexual factors in relation to Koro in 162 cases in a North Bengal Koro epidemic, has been analysed. Anato-mo-sexual factors such as venereal disease and scrotal filaria were found to be significantly commoner in Koro patients. The commonest cited precipitating factor was extramarital intercourse (23.5%).

### INTRODUCTION

The similarity of penile hyperinvolution as seen after death and in Koro has been reported as early as 102 years ago in the first Koro case report (Raven, 1886). Biomedical sexual factors are of crucial importance in the symptom choice in Koro, though to date this area has escaped due attention in the literature (Edwards, 1984). The present study is an attempt to investigate some biomedical factors, which might have an aetiological relevance so far as the choice of penile shrinkage symptom in Koro is concerned.

### MATERIALS AND METHODS

One hundred and sixty-two male Koro cases (mean age  $25.86 \pm 6.13$  years) were studied from Darjeeling, Jalpaiguri and Cooch-Bihar districts during the mid-1982 North Bengal Koro epidemic in West Bengal state, India (Chowdhury et al. 1988). Detailed clinical interview and descriptive history of Koro onset conditions were recorded for each case in a structured interview schedule. Six anato-mo-sexual factors were compared with age matched normal (who had no history of overt mental illness) control. Chi-squared tests with Yates' correction were used to examine differences between the groups.

### RESULTS

Table 1 shows the percentage distribution of different anato-mo-sexual factors. All the factors studied were more common in the Koro group except for vasectomy. Probability percentage shows the 'venereal disease' ( $p$  almost 0) and 'scrotal filaria' ( $p < .05$ ) were significantly in excess in Koro patients in comparison to the normals.

Table 1. Distribution of Anatomico-Sexual Factors

N	Koro	Normal	p*
	162	162	
	%	%	
Phimosis Present	7.4	4.3	.35
Phimosis Operated	2.5	1.2	.68
Venereal Disease	16.7	3.7	.0002
Vasectomy	4.9	12.9	.0196
Scrotal Filaria	5.6	1.2	.0656 (.032**)
Hydrocele	8.0	3.7	.16

\* probability using chi-squared with Yates' correction

\*\* probability using uncorrected chi-square.

Table 2 shows the distribution of reported possible precipitating factors. Six factors were reported, with highest frequency for extra-marital intercourse (23.5%) followed by exposure to cold water (19.14%) and a febrile episode (14.8%).

Table 2. Distribution of biomedical onset conditions

	N 162	
	No.	%
Exposure to cold water	31	19.14
Febrile episode	24	14.82
After coitus with wife	17	10.49
After coitus with girl friend or prostitute	38	23.46
After masturbation	21	12.96
During micturition	11	6.79
<b>Total</b>	<b>142</b>	<b>87.65</b>

## DISCUSSION

The present study highlights some important sex-related biomedical factors which might have a deep influence on the symptom choice in Koro. Anatomico-sexual factors not only alter the visual anatomy of the penis but also influence the psycho-physiological sensitivity of the person in the context of his sexual functioning. Both phimosis (either operated or not) and vasectomy have important significance for masculine self image (Rin, 1966). In swelling of the scrotum, as in filaria, penile hyperinvolution becomes more apparent. Patients with gonorrhoeal urethritis and urinary tract infection often complain of a transient shortening of the penis due to reflex spasm (Devereux, 1954).

Penile shrinkage following exposure to cold is a well established observation (Masters & Johnson, 1966). In the present study, 19.4% of cases experienced the onset of the Koro attack while they were either engaged in agricultural work (with the lower portion of the body under water) or taking a bath in a river. A few reported after coming out from water they suddenly noticed a "goose pimples" appearance of their scrotum and extreme shortening of the penis, often completely, "hidden within the abdomen" and instantaneously they felt the acute Koro pang.

In acute physical exhaustion the penis usually becomes smaller than its normal flaccid size (Masters & Johnson, 1966). Such a mechanism may explain the role of fevers. In our sample 14.8% of cases developed Koro in the midst of a high febrile illness and seven cases had positive blood smear for the malaria parasite.

Penile hyperinvolution becomes obvious consequent to failed sexual intercourse (Masters & Johnson, 1970) and is a frequent complaint of impotent patients. The development of Koro after intercourse is also reported here, particularly after coitus outside marriage. In this latter situation, many patients (68.42%) expressed their "lack of satisfaction" in the act which preceded their Koro attack. Some patients reported a state of "transient shortening of the penis" directly after masturbation preceded their attack. This is also reported by Chinese Koro patients (Wen & Wang, 1981). One Koro patient of this study (a medical student) reported a state of complete anaesthesia of the penis during an attempt to micturate precipitating his attack.

Retraction of the penis occurs due to hyperbloating and intestinal distension after death. The first Koro patients in this epidemic (all

from Dhupguri village in Jalpaiguri) reported having seen a naked male dead body. This death was locally believed to be due to a sexual disease and subsequently Koro was attributed as the "real cause" by the villagers. This 'death due to penis shrinkage illness' had become a topic of intense debate throughout the entire region when the epidemic was at its height.

It is highly likely that the high rate of penile and scrotal problems in the Koro group (40.2% of 14.1% in controls) has rendered them oversensitive to normal penile experiences ( Chowdhury, 1989b ). This epidemic displayed many of the characteristic features of Koro spread via rumour. More unusually a clear precipitating event for the epidemic could be discerned in the bloated corpse in Dhupguri village.

**PHYSIOLOGICAL SUBSTRATUM IN KORO :  
A UNIVERSAL REALITY**

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**SUMMARY**

Koro is clinically characterized by an acute panic reaction concerning the complaints of genital hyperinvolution and fear of impending death. It is regarded as a purely psychogenic illness being initiated by cultural sexual myths and beliefs. Recent global reportings of Koro from diverse ethno-cultural contexts, however, support the role of biomedical factors as a cue to Koro perception in vulnerable individuals. The strong case in point here is the physiomorphic penile changes due to vasoconstriction from exposure to cold, fright or genitourinary functions. The present updated analysis of world Koro literature favours this contention as a universal reality.

## INTRODUCTION

The publication of classical Koro account by Yap (1965a) and the concomitant analytical case reports of Rin (1965) and Gwee (1968), all among the ethnic Chinese, help to establish Koro as a morbid expression of sexual anxiety. This postulation acted for a considerable period of time like a cornerstone in the definition of Koro as a culture-bound syndrome. The successive reportings of more Koro cases from different parts of the globe in the background of varied psychiatric disorders, organic mental states and drug abuse, make the probability higher for the presence of an anatomic-physiological substratum in the etiopathogenesis of Koro illness. The strong case in point here is the dynamic vascular penile physiology and its differential response to changing physical states.

## THE BIOMEDICAL CONSTRUCT

Edwards (1984) in his detailed analysis of Koro phenomenon as a genital retraction syndrome in insular South East Asia indicated the potential role of biomedical factors in the initiation of Koro perception. Chowdhury (1989a) found a set of biomedical conditions conducive of Koro perception in an epidemic setting in India. It is a long mystery as to how the Koro attack sets in, and, even in the presence of strong socio-cultural influence, how this cognition (penile) earns its clinical expression through genital symptom choice in Koro. Simons (1986) thus postulated a physiological substratum as the initiator with eventual cultural elaboration in Koro.

Quite a handful of Koro research in this decade positively found the role of a few biological conditions where the penis size does alter, though isolate this morphological alteration does not signify anything pathological. It has a certain significance only for those individuals who, because of multiple reasons, viz. high neuroticism (Yap, 1965a; Chowdhury, 1990; 1991); hypochondrical concern (Ifabumuyi & Rwegellera, 1979; Rosenthal & Rosenthal, 1982); sexual obsession (Hes & Nassi, 1977; Cremona, 1981); sexual guilt and conflict (Rin 1965; Chowdhury, 1989b); inferior masculine self-image (Rubin, 1982) or morbid preoccupation with genitourinary functioning (Anderson, 1990; Chen, 1991) etc., are strongly susceptible to a heightened genital aware-

ness to such an extent that they obsessively indulge in minute genital observation and monitoring, during which the nonsignificant physiomorphic penile changes act as a psychological cue for the individuals' pathoperception of Koro genital symptom. The degree and dimension of anxiety and the ideational component of genital retraction take the appropriate spectrum as per the individual's cultural construct of sexuality and its dysfunctions. Both the components, physio-morphic and psychological, are mutually dependent and reinforcing. Simons (1985) described this vicious cycle as a "self-incriminating causal loop" in the genesis of Koro symptoms.

The genital awareness is not only pathognomonic for Koro, but also seen in varied forms in cases of sexual neurosis, psychogenic impotency, dhat syndrome, obsession and hypochondriasis. Penis is intimately related with two very important genitourinary functions, viz. micturation and semen ejaculation. Both discharges serve vital functions, the former as a life sign and the latter as a pleasure or masculine sign, and thus have important cognitive background in every culture. This background is overemphasized or unduly cared for by certain individuals or in some cultures. Individuals who are having obsessive/hypochondriacal preoccupation with shape, size of penis or testicles, quantity and quality of urine or seminal fluid flow, usually attribute great pathological significance to either trivial normative or fictitious genital changes.

It was regarded for a considerable period that this whole cognitive process (morbid perception) was purely psychological in nature and was absolutely dependent on the cultural construct of sexual functioning. However, recently the presence of some biomedical clue, causing alterations in penile morphology, has been stressed as the physiological substratum upon which the perception of genital decompensation evolves.

The linear continuum of aging probably influences the cognitive evaluation of penile morphology in Koro cases. Patients of younger age groups usually attach significance to penile morphology change due to cold, after masturbation or intercourse or in failed intercourse whereas for older patients urinary hesitancy, changes of urine flow or fear of urinary obstruction become the most important cognitive stress prior to Koro perception. The loss of masculine strength and

death anxiety in respectively younger and older Koro patients perhaps constitutes the most probable ideational component of the Koro morbidity. This cognitive shift is well corroborated by the psychodynamics of changing sexuality across the ages.

The present analysis will highlight the probability for biomedical potentials to be a biological clue to Koro perception as reported in the literature with relevant notes in this context.

### **Impact of Cold on Penis Morphology**

Masters and Johnson (1966) stated that penile states (hyperinvolvement or erection) are related "directly to higher cortical centres. Hyperinvolvement of the penis beyond resolution phase levels of detumescence has been observed clinically on numerous occasions. Penile involution following exposure to cold (e.g. Swimming in cold water) is well established". Simons (1986) also noted that "In the West, there are a number of jokes relating this experience to exposure to cold, usually cold water".

The cold wind or water has a definite pathogenic impact on penis so far as the Koro perception is concerned. Vasoconstriction and the resultant acute transient hyperinvolvement of penis in cold exposure are a well evidenced physiological response. Of recent interest are the findings of Oyeboade et al. (1986) showing penile plethysmographic changes in a patient where exposure to cold produced a reduction in penis circumference and Koro attack. They postulated the probability that Koro patients might have dysfunctional autonomic control of penis size, leading to more frequent or marked diminution in penile morphology than would be normal. It is also interesting to note at this point that a number of early Chinese medical writings described the potential role of penile exposure to wind or cold or ingestion of 'cold food' (e.g. ripe banana) in the malady of penile retraction (Gwee, 1968; Devan & Ong, 1987).

Table 1 analyzes global Koro data of 119 cases where the influence of cold on penis is obvious and might be a cause of penile shortening sufficient to alarm the individual to an imminent Koro attack.

### **Sexual Activity and Penis Morphology**

Masters & Johnson (1966) stated that penile hyperinvolvement specially became visually obvious immediately after failed coitus or

Table 1. Koro after penile exposure to cold.

Serial No.	Author (Year) Country/Ethnicity of cases	Number of cases	Immediate pre-Koro situation
1.	Yap (1965a) Hong Kong/Chinese	3 2 1	cold bath exposure to cold wind "wintry wind blow on him during micturation
		1	exposure of genitals in cold water
2.	Yap (1965b) Britain/English	1	"unusually cold morning"
*3.	Ngui (1969) Singapore/Chinese	38	exposure to chill, cold weather or air condi- tioning
		35	during or soon after bath
4.	Lapierre (1972) Canada/French Canadian	1	during bath
5.	Arbitman (1975) Canada/English	1	"while taking a shower"
6.	Lucieer (1984-85) Tanzania/Tanzanian	1	cleaning of penis after intercourse-feeling of intense cold in the genital area
7.	Malinik et al. (1985) U.S.A./American	1	cleaning of penis with chemical solution
8.	Oyebode et al. (1986) Britain/English	1	cycling on a cold day
*9.	Jilek (1986) China/Chinese	1	"a wind blowing, felt the penis cold"
*10.	Chowdhury (1989a) India/Bengali, Behari	31	bath or exposure to cold water
11.	Bernstein & Gaw (1991) U.S.A./Cantonese	1	burning pain in penis after exposure to cold

\*Epidemic cases.

in postcoital or postmasturbatory period because of the intrinsic vascular physiology of penile musculature and the refractory period after sexual arousal (Heiman, 1977). Table 2 illustrates 90 Koro cases where the attack was preceded by sexual activities.

### **Genitourinary Function and Koro**

Concern for genitals may be expressed during urination and/or defaecation or in imaginary genitourinary malfunctions. The usual reflexive changes in the genital organs during this expulsive process may act as a physiological cue to pathological perception. Table 3 highlights the findings of 81 Koro cases where the attack was precipitated either during excretory function or after its presumed malfunction.

### **Acute Fear and Koro**

Fear or anxiety by its vasoconstrictive effects causes reduction of blood flow to the penis and consequent penile shortening (Simons, 1985). Acute fear from either Koro affection itself or other causes is well noted in Koro cases. Table 4 depicts 17 such cases where definite acute fear/anxiety evoking immediate pre-Koro situation was present. It is interesting to note that although Yap's case was from Hong Kong and Modai et al's from Israel, there being a wide geographical and ethno-cultural difference, in this two sets of cases, the cat probably represented an identical fear symbol, the details of which need further elucidation.

In acute physical exhaustion and strain (Nandi et al., 1983; Jilek, 1986) or fever (Chowdhury, 1989a), the penis becomes smaller than its normal flaccid size and this may be an important physical clue of Koro perception in such cases (Chowdhury, 1993).

Table 2. Koro after sexual activity

Serial No.	Author (Year) Country/Ethnicity of cases	Number of cases	Sexual activity
1.	Yap (1965a)	4	after masturbation
	Hong Kong/Chinese	3	"precipitated by coitus"
		3	after ordinary sexual arousal
2.	Rin (1965) Taiwan/Chinese	1	after intercourse
*3.	Ngui (1969) Singapore/Chinese	1	after masturbation
		1	after intercourse
4.	Ang & Weller (1984) Britain/West Indian	1	during difficulty in erection for masturbation
*5.	Chowdhury (1989a) India/Bengali, Behari	17	post-coital (wife)
		38	post-coital/failed intercourse with girl friend or prostitute
		21	after masturbation

\*Epidemic cases.

Table 3. Koro with excretory function.

Serial No.	Author (Year) Country/Ethnicity of cases	Number of cases	Immediate pre-Koro urinary/excretory function
1.	Gwee (1963) Singapore/Chinese	1 1	during micturation during defaecation
2.	Yap (1965a) Hong Kong/Chinese	1 1	after micturation micturation in cold
*3.	Mun (1968) Singapore/Chinese	1	while urinating
*4.	Ngui (1969) Singapore/Chinese	57 3	during micturation after defaecation
5.	Berrios & Morley (1984) England/English	1	attempting to urinate
*6.	Chowdhury (1989a) India/Bengali, Behari	11	during micturation
7.	Anderson (1990) England/English	1	fear of "inability to pass urine"
8.	Chen (1991) England/English	1	a poor urinary stream
9.	Kennedy & Flick (1991) U.S.A./American	1	hesitation and strain on urination (as a side effect of imipramine therapy)

\*Epidemic cases.

Table 4. Fear as a precipitating factor in Koro.

Serial No.	Author (Year) Country/Ethnicity of cases	Number of cases	Specific fear situation
1.	Yap (1965a) Hong Kong/Chinese	3 1	acute fear of Koro affection frightened - when mother fainted or cat suddenly jumped down near him
*2.	Nandi et al. (1984) India/Bengali	3	acute fear of Koro affection
*3.	Sachdev (1985) India/Assamese	1	acute fear of Koro affection
*4.	Jilek (1986) China/Chinese	1	fear of ghost in the bed in a power-cut night
5.	Modai et al. (1986) Israel/Jewish	1	fear, induced by a black cat on the dark night
*6.	Chowdhury (1992) India/Behari, Bengali	6 1	acute fear of Koro affection acute fear of social humili- ation due to an illegal sexual relation

\*Epidemic cases.

### CONCLUSION

It is evident from this discussion that the association between Koro perception on the one hand and cold, fright, sexual activity or excretory functions on the other does provide a reasonable probability that penile vasoconstriction is the objective reality which triggers Koro cognition. The present case analysis from various ethnicities and culture across the globe shows that cultural beliefs do generate a background of cognitive sensitivity, based on which physiological or biomedical phenomena initiate the morbid expression. A biological analogy, though unrelated, is the action of progesterone on the oestrogen primed endometrium of the uterus in menstruation. Thus, both components are likewise crucial in the cognitive sphere of Koro individual - the priming action of cultural beliefs and the triggering effects of physiological (penile) substratum.

*CHAPTER - 9*

**PENIS IMAGE PERCEPTION**

- \* **PENIS LENGTH PERCEPTION**
- \* **DRAW-A-PENIS TEST (DAPT)**
- \* **PENIS ROOT PERCEPTION**
- \* **GLANS PENIS PERCEPTION**
- \* **DYSMORPHIC PENIS PERCEPTION - THE  
ROOT OF KORO VULNERABILITY : A LONGI-  
TUDINAL STUDY**
- \* **PERCEPTUAL DEVIATIONS IN PENIS IMAGE.**

## PENILE PERCEPTION OF KORO PATIENTS

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### A. Penis Length Perception

#### SUMMARY

Koro is a psychogenic reactive state where the perception of penile length-decrease due to shrinkage from intra-abdominal traction occupies the central pathology. Just prior to their attack, the patients perceive penile length decrement and well after the Koro illness most of them also retain this perception of small penis. The present investigation attempts to explore the penis-perception of the Koro sufferers by devising a graphomotor projective test: Draw-a-Penis-test (DAPT).

DAPT elicits the penis-image perception of the drawer, having to do with not only the penis of a normal person but also the self-penis too. It also brings out the nature of the perceptual process concerning the penile state from flaccid to extended change, DAPT measures (in cm.) depicts the total profile of organ (penis)-image perception viz., length, width of shaft and root, nature of root and glans as well as associated body-image perception related to sex organs.

In this well controlled DAPT investigation certain perceptual disturbances concerning penis-image become evident in Koro patients. A Koro patient perceived less penis length, regarding both his own penis and that of a normal person, in comparison to those of the controls, though in reality the penis lengths of Koro patients are either similar to or even longer than those of the controls. They also failed to perceive the effective morphological changes from flaccid to extended penile state. These perceptual deviations in body (organ)-image are discussed in relation to the psychopathology and Koro vulnerability of the objects.

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## INTRODUCTION

"The medical profession has long acknowledged the importance of patients' feelings toward their bodies. Body image phenomena have been recognised since Ambrose Pare reported the phantom limb in the sixteenth century" (Schwab & Harmeling, 1968). Body image is the person's perception of his body and how he feels about his perception (Pauly, 1980). This personal psychological body image or corporeal awareness is a mixed abstraction, partly perceptual, partly conceptual and partly intellectual (Cotterill, 1983). MacDonald (1979) defined the corporeal awareness as, "the idea which an individual possesses about the physical properties of his own anatomy which he carries over into the imagery of himself". Most of the recent researches were addressed to the study of gross body-image disturbances resulting from amputation, brain-damage and physical disability (Klob, 1959; Stenback, 1964; Cassell, 1965) or of the relationship of body-image perceptions and psychological reactions (Horowitz et al., 1964; Hall, 1968; Sommer, 1969; Fried & DeFazio, 1974). A series of investigations concerning body-image concept has shown that a subject's feelings about his different body parts have important implications not only in the symptom choice, emotional distress and psychophysiological reactions (Bender, 1934; Johnson, 1956; Williams & Kranpsnoff, 1964) but also influence the nature of the treatment outcome (Fisher & Seidner, 1963; Fisher, 1964; Schwab et al., 1966). So the pertinent point of observation in the somatopsychological relationship is the perceptual process concerning body-image and its consequent cognitive process of value assignments (determined by socio-cultural learning) on the different body parts and both of them play a crucial role in the manifestation of aberrant mental functioning (Ehrentheil, 1959).

The body perception is very important in the sphere of mental illness concerning sexuality. The nature and extent of sex-organ perception influences the direction of psychopathologic deviation and even the content of hallucination and delusion (Watson and Johnson, 1956; Ehrentheil, 1958). A person's sexuality is shaped by his or her self-concept and the body-image is one important

ingredient for the functioning of this self-concept (Pauly and Goldstein, 1970). Of all the body areas, corporeal awareness of gender-defining body parts viz., penis size and breast development perception, is not only important for the development of body concept and self-esteem but also influences social adjustments and psychosexual deviations (Money et al., 1957; Cotterill, 1981). It is found that the perception of smallness of physique or hypogonadism is an important psychodynamic factor that influences the mental functioning (Ehrentheil, 1959). Defective perceptual process is closely linked with various types of psychopathological symptoms (Freedman and Chapman, 1973) and may be an important component of vulnerability to psychopathology (Hoffer and Osmond, 1966; Ornitz, 1969).

Koro, a psychogenic acute anxiety reaction where the perception of decrease in the penis length due to shrinkage from intra-abdominal traction, is the core psychopathological picture. The purpose of this study is to investigate the nature and extent of the perceptual profile of penis-image of Koro patients and to examine the related characteristics or deviations of their penis-image perceptions in comparison to those of normal subjects or of similar patients (illness involving sex organ).

#### **AIMS OF THE STUDY**

With this aim in view, the present investigation is designed to study the following perceptual dimensions of penile length of Koro patients.

1. Perception of Penile Length of a Normal person,
2. Perception of Penile Length of Self,
3. Measurement of Real Penis Length,
4. Comparison between Real Penis Length and Perceived Penis Length measures, and
5. Intra-perceptual comparison of Penile Length perceptions.

## MATERIALS AND METHODS

### A. Study Population

I. The Experimental Group : Koro patients are the experimental group. The cases were collected from the Koro epidemic that took place in North Bengal Region (West Bengal State) from July to Sept. 1982. By following an operational case-selection criterion, a total of 36 rural and 41 urban Koro cases were listed. A set of 20 cases from each pool was taken for this study by random sampling without replacement.

The following were the case-selection criteria :

1. Age : An age range from 20 to 40 years was taken. To avoid the perceptual distortion arising out of penile change consequent to aging, the cases over 40 years of age were not included. Similarly, the teen-age group was excluded because of the intense sexual preoccupation (related to rapid change of sex anatomy and physiology) present during this period.
2. Marital Status : Only single patients were taken to make the sample homogenous regarding marital status. Marriage, by virtue of its sexual practice and heterosexual relationship, involves multiple sexual variables that may influence the penile perception in diverse ways.
3. Education : A minimum education of VIIIth grade schooling was taken, for the ease of this investigation as it involves a nominal drawing ability of the subject.
4. Residence : Two sub-samples, 20 rural and 20 urban residences, were taken for the intragroup comparison of penis perception, as the psychological dynamics of urban life is different in many aspects from the rural one, at least regarding sexuality.
5. The cases had only one Koro attack and there was no history of Koro in their families.

6. The cases had no history of any penile or scrotal illness, injury or operations.
7. The cases had neither any history of overt mental illness nor did they visit a psychiatrist.
8. No drug was being taken by the patient at the time of testing. It was also ensured that a 48 hour drug-free period was maintained immediately preceding the test.
9. The cases were all Hindus by religion.
10. Only those who agreed to take part in this investigation and signed the consent form willingly were taken.

II. Control Groups : Four control groups, each of similar size (except Scrotal Filariasis Group), were taken for comparison. One was a 'Normal Control' group and the rest three were 'Patient Control' groups. All were matched for age, marital status, education and residence with the Koro group. Almost identical selection criteria were observed in all the control groups, there being no history of Koro either of the subject or in his family.

1. Normal Control Group :

These had neither any history of physical defect or disability nor any mental illness.

2. Patient Control Groups :

(a) Hydrocele and (b) Scrotal Filariasis Group.

These two groups were taken as organic disease control (concerning sex organ) groups. The rationale behind this selection is the observation that organic or functional changes in the scrotal size may have some relation with Koro perception (Edwards, 1984; Chowdhury, 1985). Of course, a patient who has some illness of penis would be the most appropriate patient control for this study,

but the abscess penis or carcinoma penis cases were not taken because of the emotional involvement in such diseases as well as the associated pain and discomforts which are clinically altogether different from those of Koro. Moreover, in such penile organicity there is breach of body surface that may have a different perceptual impact, unlike the situation in Koro where the whole illness phenomenon is without any external injury to the body surface, i.e., the integrity of the outer body layer is preserved.

The size of the Scrotal Filaria group was not same (rural 17 and urban 14) because of the want of strictly matched patients. Patients of both the groups were selected indiscriminately as regards their side of affection (i.e., right or left). All the cases taken had no features of secondary infections or cellulitis of scrotum and the duration of the complaint was not more than 3 months. Patients were collected from the Male Surgical OPD of North Bengal College Hospital, Darjeeling .

#### c) Anxiety Neurosis Group

In view of the presence of the central emotional nucleus of anxiety in Koro phenomenon, this group was taken as the psychiatric disease control group.

These cases met the criteria of ICD-9 code 300.0. In addition to the general selection criteria, the following two criteria were maintained :

1. The duration of illness was not more than 3 months, and
2. The patients are attending a psychiatrist for the first time.
3. The cases were collected from the Psychiatry OPD of North Bengal Medical College Hospital, Darjeeling.

The following table illustrates the age range of the study population.

		<u>Age in Years</u>	
		$\bar{x}$	sd
KORO	:	27.71	5.64
NORMAL	:	27.55	5.13
HYDROCELE	:	27.53	5.37
SCROTAL FILARIA	:	28.35	5.94
ANXIETY NEUROSIS	:	27.46	5.02

## B. Draw-a-Penis-Test (DAPT)

The relationship between perceptual performance, cognitive style and psychopathology is an important research area in psychiatry (Schooler and Silverman, 1969). The Draw-a-Penis-Test (DAPT) is such a graphomotor projective test devised for the purpose of research of penile perception of the drawer. The general assumption here is that the drawing of the body part represents the expression of the concept of organ (penis)-image of the drawer, similar to (the fact in) the Draw-a-Person test (Carr, 1980). This process of elicitation of penile-image by drawing may be viewed as a cognitive approach to perception (Frith, 1973), i.e. perception is being regarded as a cognitive process (Spivack, 1963). In cognitive processing, the major emphasis is on the information content of the stimuli, where the effect of information influences the response measured (Underwood, 1957). The DAPT in this context may be viewed as a long-term conceptually driven (Lindsay and Norman, 1977) cognitive processing experiment.

### DAPT Content :

Two dimensions of penile perception are identified : Trait penile perception and State penile perception. Clinically the trait penile perception is the perception of flaccid penis - the size and shape of the penis during usual time (i.e. in times other than sexual arousal). This penile morphology is almost fixed and somewhat unchanged and by saying 'penis' this condition is usually referred to, in other words this state is usually regarded as the usual penile concept. The state penis perception is the perception of penile morphology during sexual arousal, i.e. the extended penis. During the phase of sexual excitement there is a change in the penile morphology (i.e. in length, width of the shaft and expansion of the glands etc.) and the perception of this kinetics of morphologically altered state change of penis is the state penis perception.

Two sets of situations are included in the DAPT for intra-test cognitive variations of penile perception. One is the drawing of a penis of a 'Normal Person' (without any disease) in reference

to the age of the drawer. The other one is the drawing of the self-penis. The comparison will not only enable the detection of the variations or deviations of self perception but also provide the concept of normality of penile configurations of the drawer.

DAPT Instructions and Administration :

The subject is provided with a sharp pencil or a ball pen and a foolscap blank paper and is asked to draw step by step the following items :

1. [Normal Flaccid (NF)] : Please draw the exact penis of a normal \* person during usual time. The person has no illness (and is of your age\*).

---

\* This can be modified as per the age of the drawer as "normal person say aged about 32 years". In that case omit the clause "and is of your age\*).

---

2. [Normal Extended (NE)] : Please draw the exact penis of this person when he experiences sexual excitement.

3. [Self-Flaccid (SF)] : Please draw your own penis exactly as you have during usual time.

4. [Self-Extended (SE)] : Please draw your own penis exactly as when you experience sexual excitement.

The subject is instructed on the following points about the drawaings :

1. 'In the event of difficulty in understanding of the instructions please do not hesitate to get clarified'.

2. 'The instruction' exact/exactly' often needs some clarification and this should be done as : 'exact' means the real size and shape of the organ a person has or you have' or, in other words, 'draw the organ as similar as possible to that you really have'.

3. 'Please do not hesitate about the beauty of the drawing. There is no right or wrong, good or bad, correct or incorrect drawing. Draw as you perceive the penis and follow whatever way you like to draw'.

4. 'Please try to draw in a single attempt as well as you can'.
5. 'Please try not to use double lines in your drawing' [because this will hamper proper measurements].

**N.B.** : The sentences within square brackets [ ] are not for communication to the drawer.

#### DAPT Scoring :

The following features of the drawing are noted and all the measurements are expressed in centimetres.

1. Penile length
2. Nature of the root of the penis (close or open).
3. Identifiable glans penis
4. Width at the root of penis
5. Maximum width of the shaft
6. Any associated drawing

Penile length measurements (Figs.1 & 2) : The mid-point of the line, joining both the root ends (in case of open root drawing) or the root approximation point (in case of close root drawing), is joined with the tip of the glans or the tip of the head (in case of no identifiable glans). The line will be measured by a centimetre scale and expressed as penile length measure.

Nature of the Root of the Penis (Figs. 1 & 2) : Two types of roots are identified - (a) Close Root, where the two shaft lines are joined. (b) Open Root, where the two lines are not joined to each other.

Glans Penis (Figs.1 & 3) : Glans is called 'identifiable' when the drawer attempts special lines or alters the lines to mean the glans. When there is no such attempt in the drawing, it is simply called the 'head'.

Width at the Root of Penis (Fig.3) : This measurement is possible only in cases of open-root drawing. The measurement of the line joining the two end points of the shaft lines towards the root is called the width at the root.

Maximum Width of the Shaft (Fig.4) : This is the measurement of the line joining the two opposite maximally situated points on the

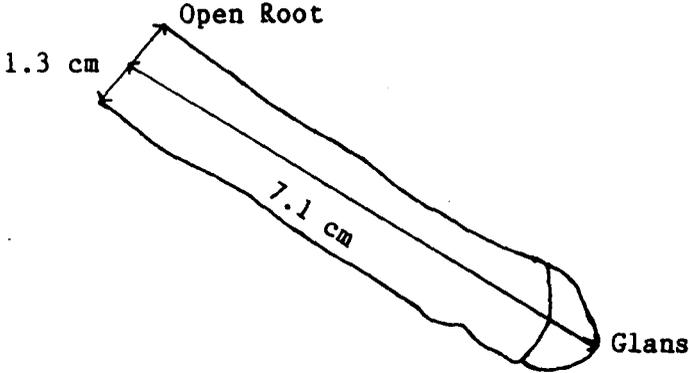


Fig.1

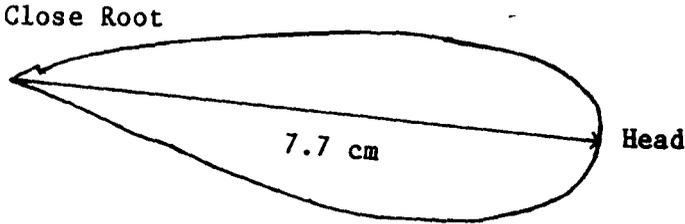
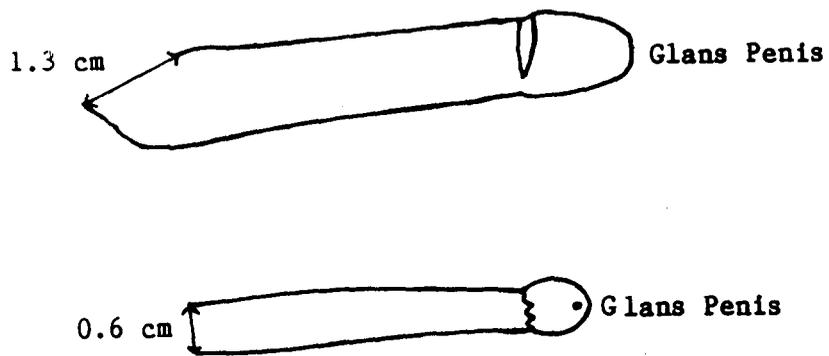
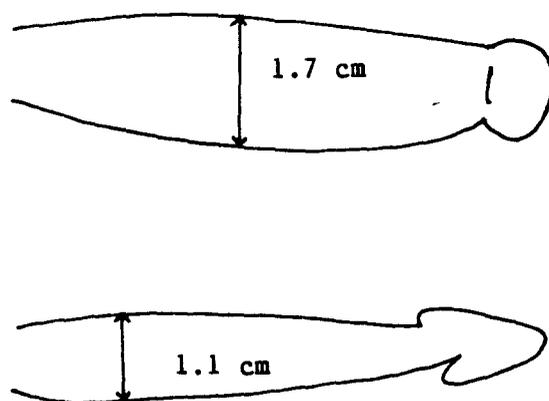


Fig.2

Fig.1 & 2. Penis Length Measurement in DAPT.



**Fig.3.** Route Measurement in DAPT.



**Fig.4.** Maximum Width of Shaft Measurement in DAPT.

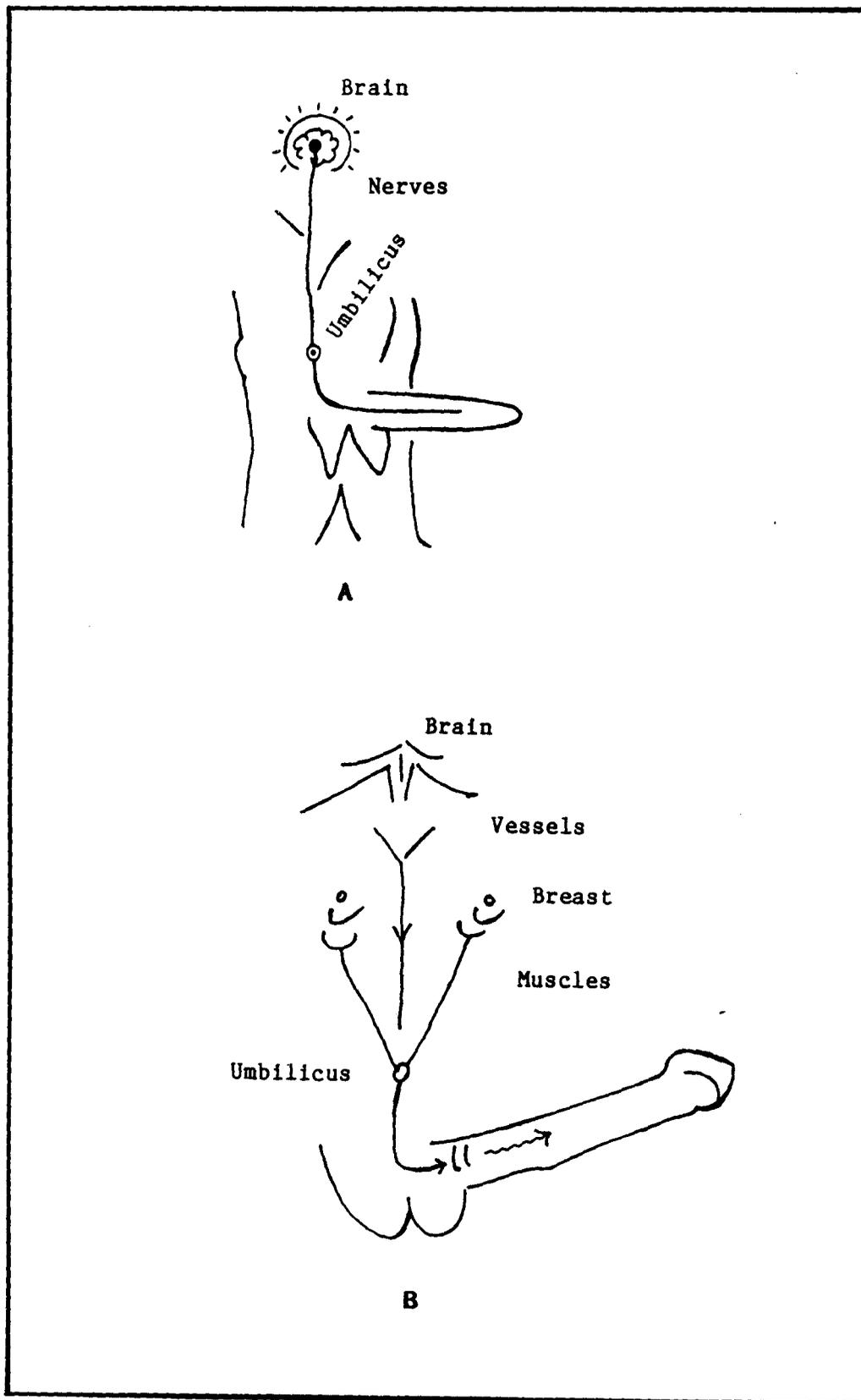
shaft lines.

Associated Drawings (Figs. 5 & 6) : In spite of the instruction to draw the penis only, many subjects draw other body parts in association with the penis only, eg. scrotum, breast, chest muscle etc., and these are called associated drawings.

Clinical Utility of DAPT :

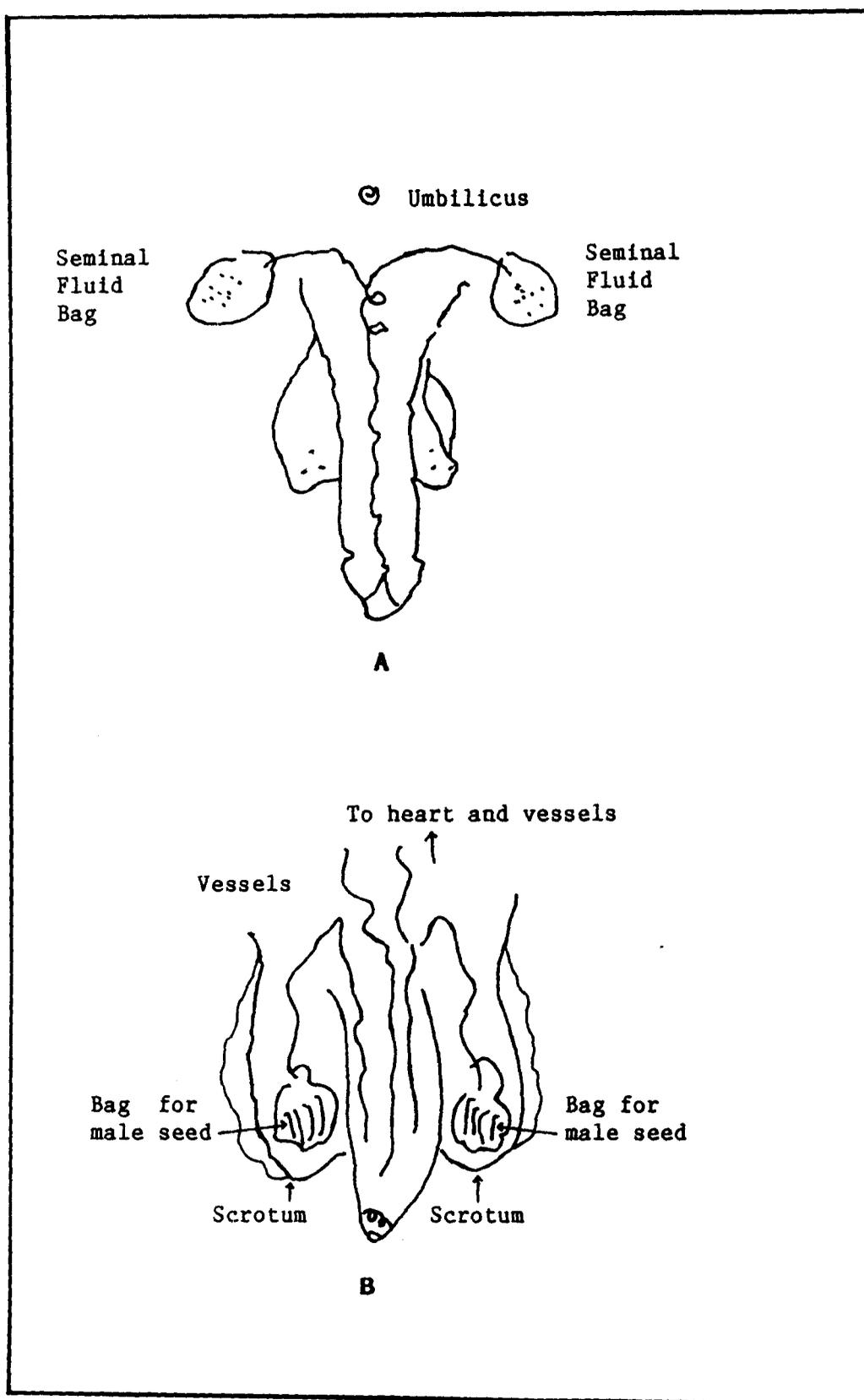
DAPT scores project important factors of clinical significance in respect of the psychodynamics of the patient and his illness. The perception of length and width of penis may be related to the construct of masculinity or its associated conflicts. The presence of glans or open and close root similarly is indicative of the perceptual integrity concerning the patient's organ-image. Associated drawings are of crucial clinical significance in terms of conflict-laden body areas related to sexuality. All these findings will help to map out the patient's cognition of body reactivity landmark (Fisher, 1959) or symptom localization (Cassel, 1965) or psycho-sexual symptom formation (Fisher and Cleveland, 1958 ).

It should be remembered that the DAPT scores of any patient group should always be compared with those of a matched control of normal subjects, as perception is supposed to be heavily influenced by the socio-cultural cognition. DAPT results should be interpreted in relation to the psychosomatic symptoms referable to the genital system. Though devised mainly for the male, it may be administered to female subjects with some modified instructions. DAPT values of penis length perception of different groups are presented in the following table. DAPT drawings of different subjects are shown in Figures 7 to 11.



**Fig.5.** Associated DAPT drawings.

- A. DAPT of a Koro patient
- B. DAPT of an Anxiety neurotic



**Fig.6.** Associated DAPT drawings.

- A. Patient of Dhat Syndrome
- B. Patient of Scrotal Filariasis

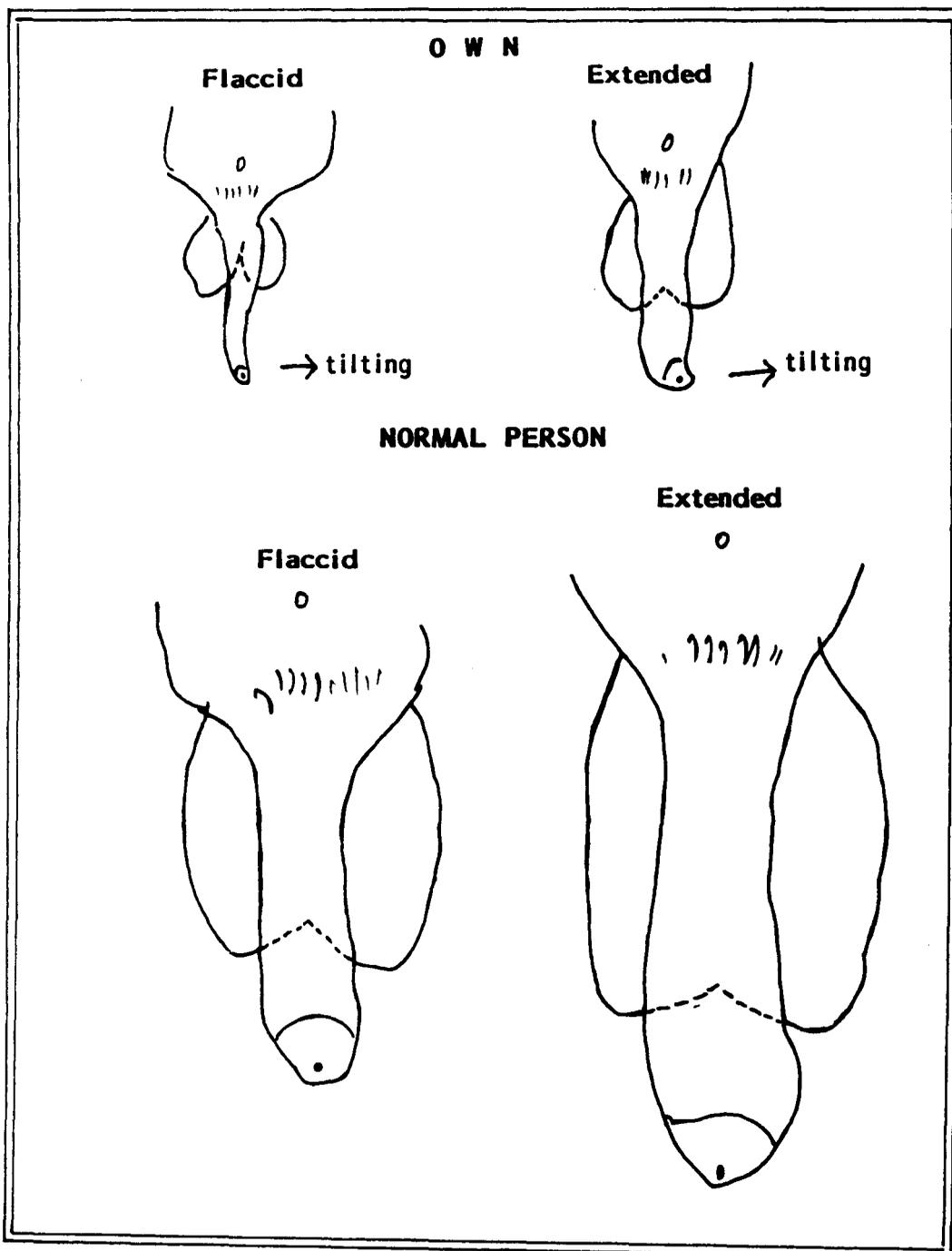


Fig.7. DAPT drawing of an urban Koro patients.

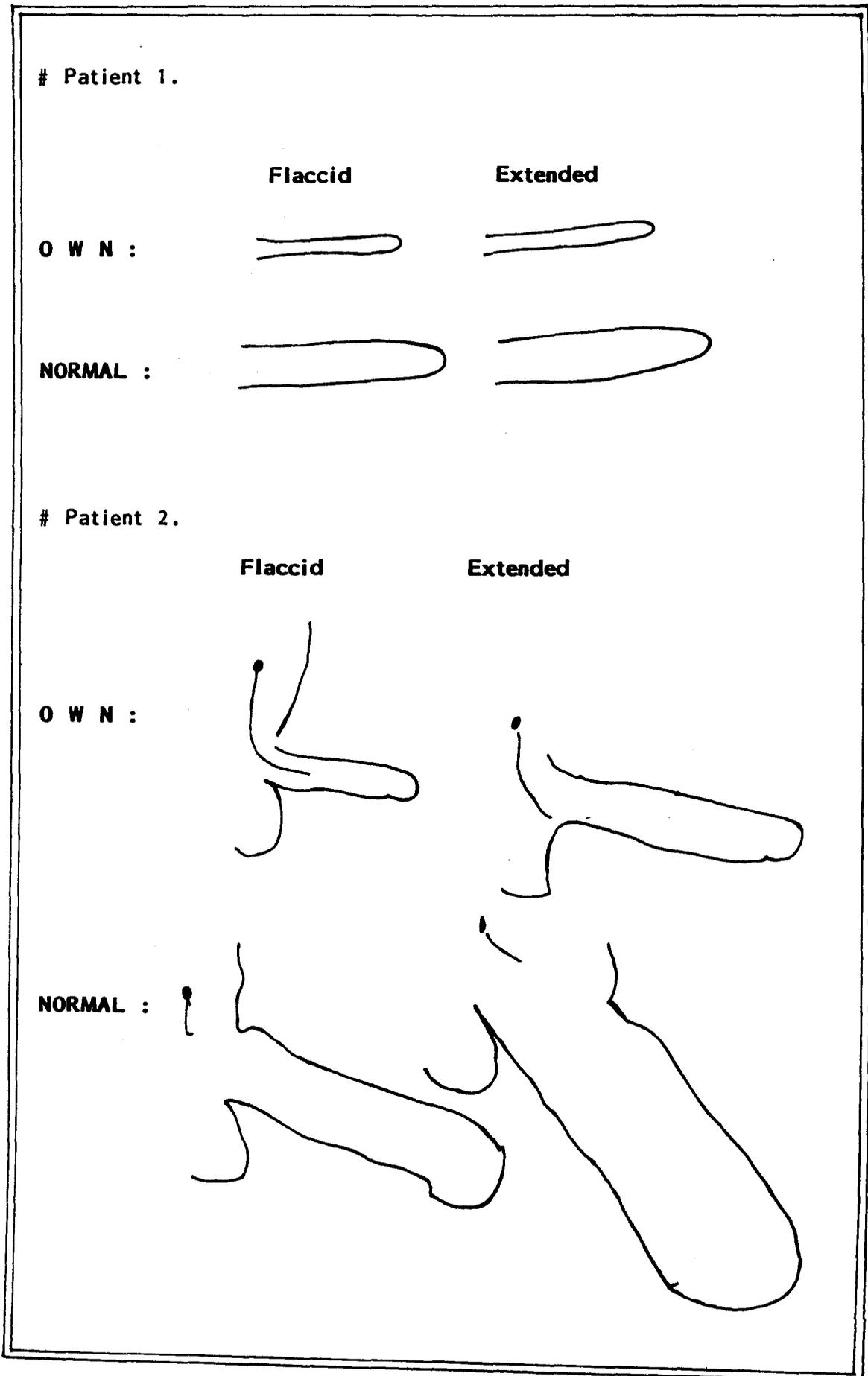
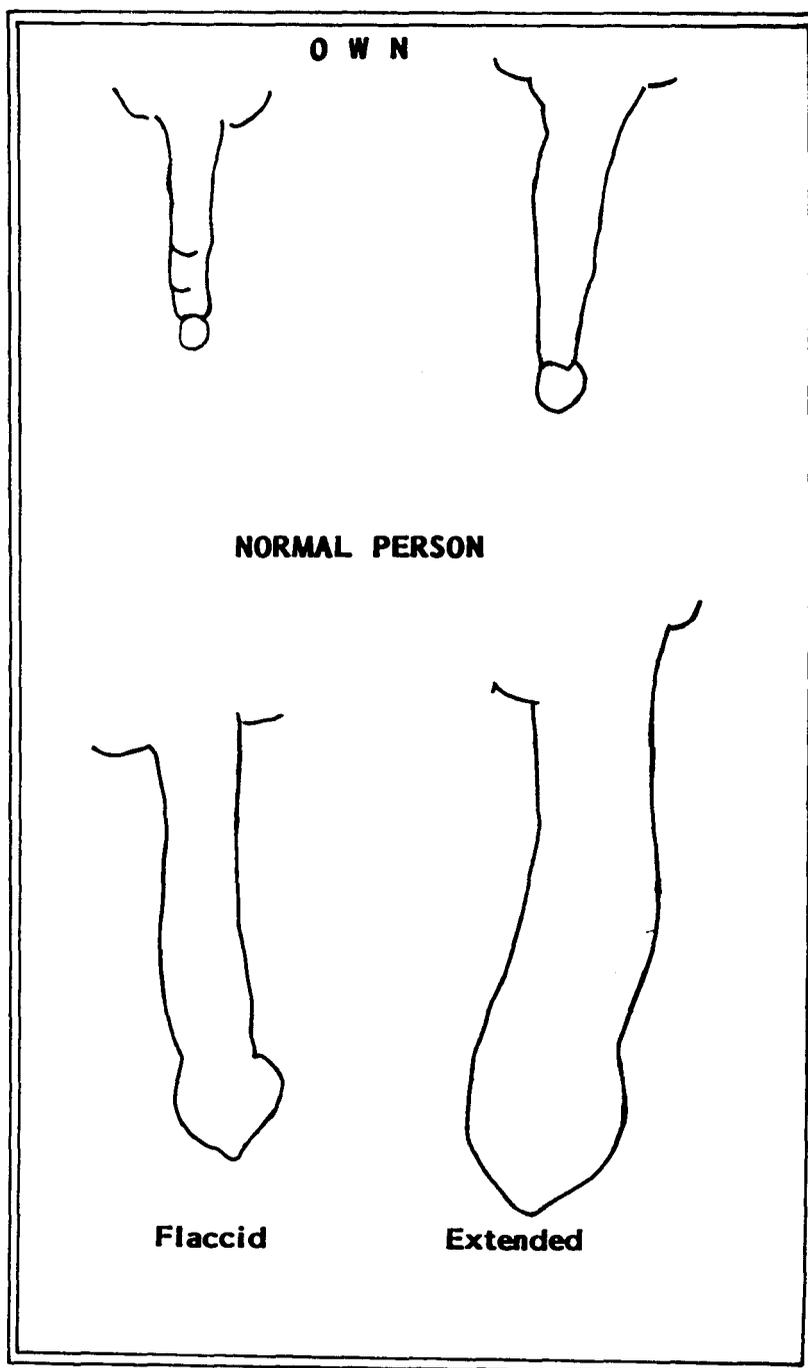
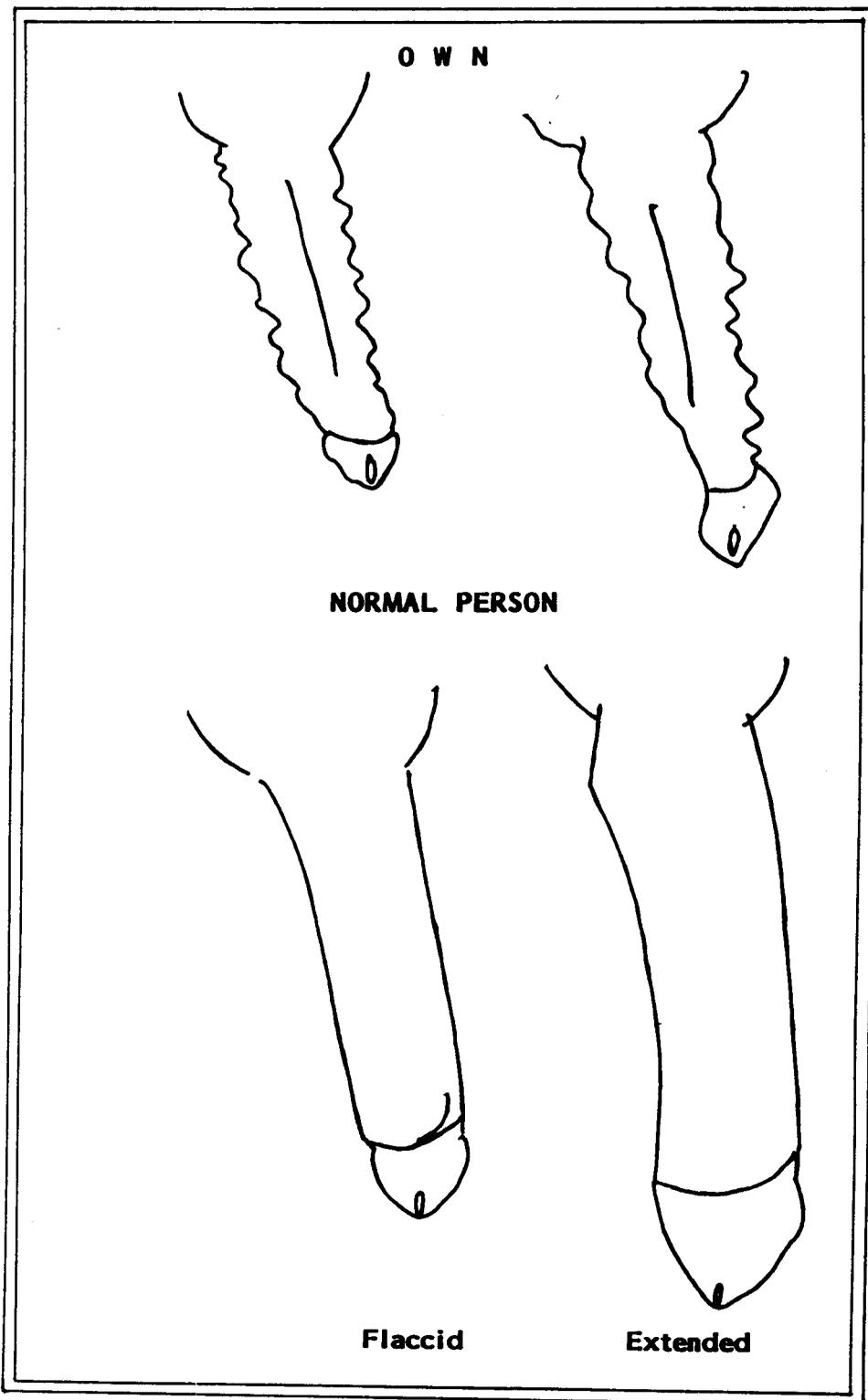


Fig.8. DAPT drawing of two rural Koro patients.



**Fig.9.** DAPT drawing of a patient of Anxiety neurosis.



**Fig.10.** DAPT drawing of a patient of Dhat syndrome.

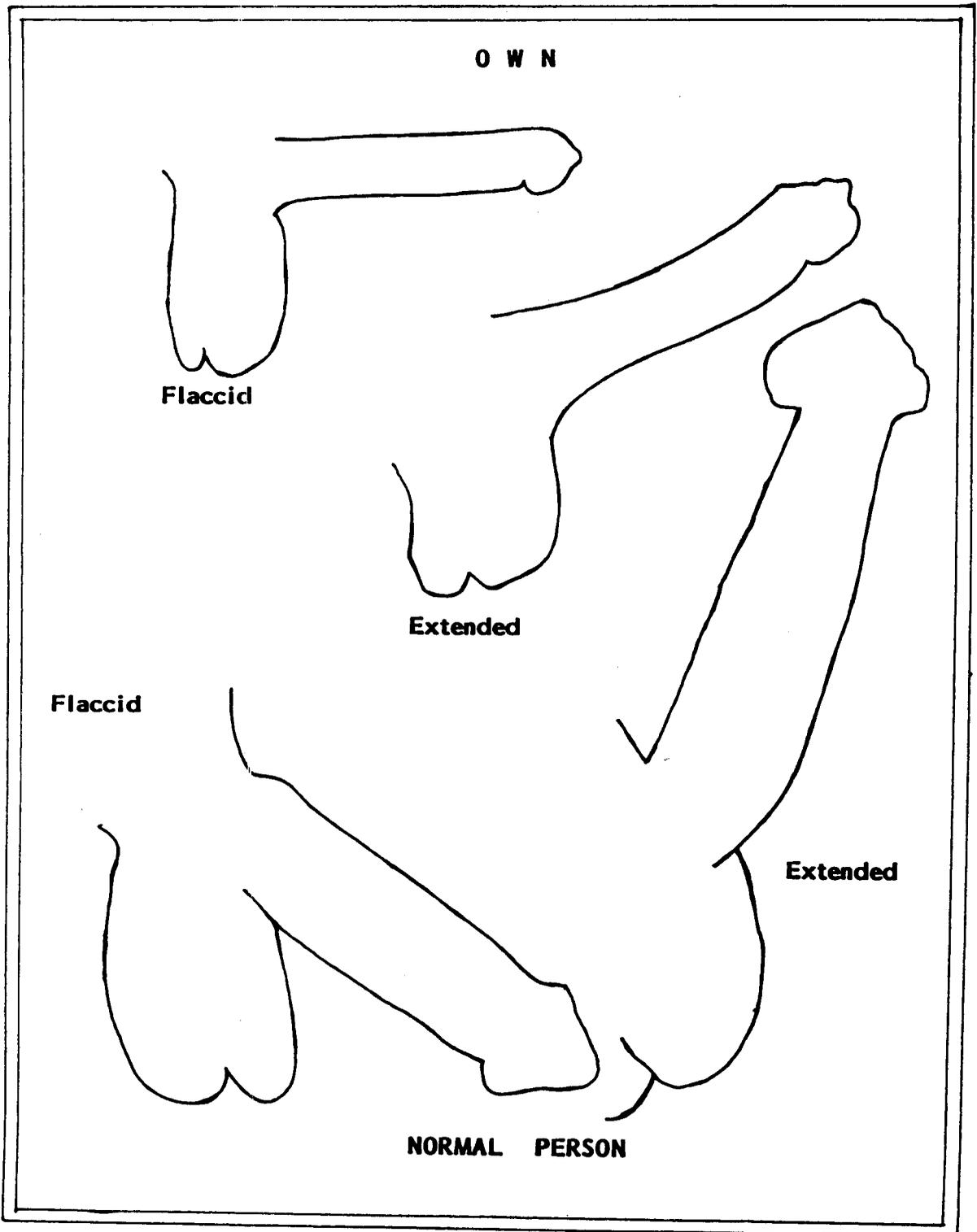


Fig.11. DAPT drawing of a Normal subject.

**DAPT Scores of penile length perception (n 484)**

Group	N	Age(years)		Penile length perception in cm							
		$\bar{x}$	sd	Normal Penis				Self Penis			
				Flaccid		Extended		Flaccid		Extended	
				$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd	$\bar{x}$	sd
Normal Subjects	164	27.2	8.8	7.6	1.5	9.4	2.2	8.1	1.2	9.7	1.4
Anxiety Neurosis	84	30.7	9.7	5.6	1.3	8.1	1.8	6.4	1.3	8.1	1.6
Neurotic Depression	36	24.1	6.4	6.2	1.7	7.3	1.0	5.8	0.9	6.4	1.1
Psychogenic Impotence	40	25.6	11.8	6.1	0.8	8.4	1.7	5.3	1.1	5.7	0.7
Dhat Syndrome	27	21.4	5.3	5.9	1.4	7.9	2.3	4.8	1.4	6.4	1.3
Hydrocele	43	29.5	8.8	6.8	1.1	8.2	1.4	7.5	1.9	8.6	1.3
Scrotal Filaria	33	31.3	7.2	6.9	1.4	8.1	1.3	7.6	1.5	8.4	1.5
Koro Patient	57	27.9	8.6	4.7	1.5	5.8	1.3	3.8	1.4	4.8	1.6

**C. Time of DAPT administration in Koro patients**

Perceptual experience may be influenced by the effects of information and time is an important common temporal metric in any processing experiment (Weckowicz, 1964). So the DAPT was administered well after the Koro attack, at least after 7 days from the episode when the patients were clinically free from the Koro symptomatology. The usual hour of the DAPT for all the groups was between 9 a.m. to 11 a.m. at the Psychiatry OPD. The following table will illustrate the mean time intervals (in days) between the Koro attack and the DAPT administration. Fig.12 and 13 shows the DAPT administration to Koro patients by the author at the Psychiatry OPD of North Bengal Medical College Hospital.

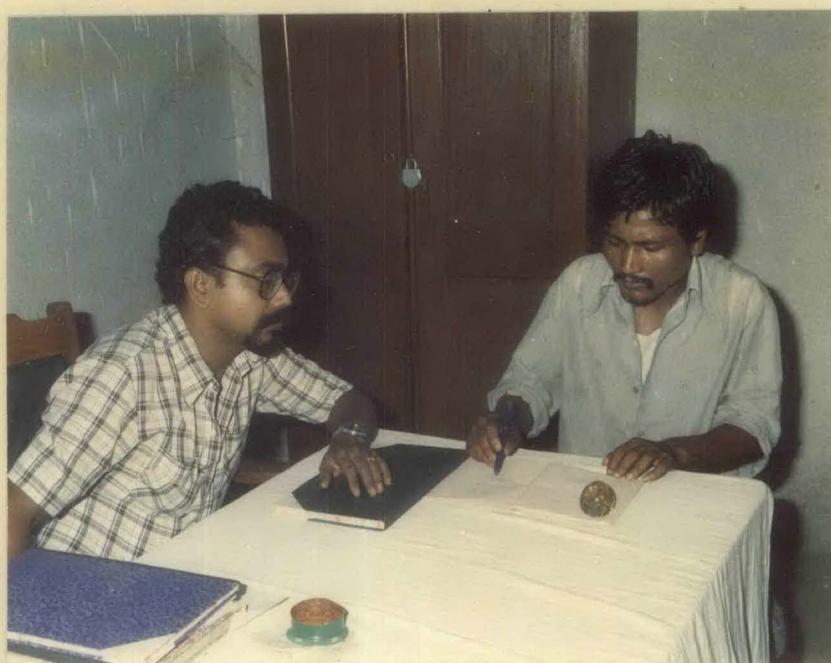


Fig.12



Fig. 13

	Rural	Urban	Total
N	20	20	40
	$\bar{x}$ sd	$\bar{x}$ sd	$\bar{x}$ sd
Time interval in days :	14.7 (5.9)	13.6 (6.6)	14.2 (5.9)

#### D. Real measurement of Flaccid Penile Length

It is the measurement in cm. of the ventral surface of the penis from the root upto the tip of the glans. Measurement in the patient groups at the clinic posed no problems (Figs.14, 15, 16) but it was a bit difficult for the normal subjects. Though they were well instructed how and when (around 9-10 a.m.) to take penile length measurement and were provided with a cm. scale, in some instances a few had to be asked to come to the clinic individually to see the demonstration of how we are taking the measurement of our patients (after taking the consent from the patient concerned).

#### E. Statistical treatment of the Data

The following test statistics are used in this study.

##### 1. t test :

To test  $H_0 : \mu_1 = \mu_2$ , the t test is used. The test statistics is -

$$t = \frac{(\bar{x} - \bar{y}) - (\mu_1 - \mu_2) \sqrt{n_1 + n_2 - 2}}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{(n_1 - 1) s_1^2 + (n_2 - 1) s_2^2}}$$

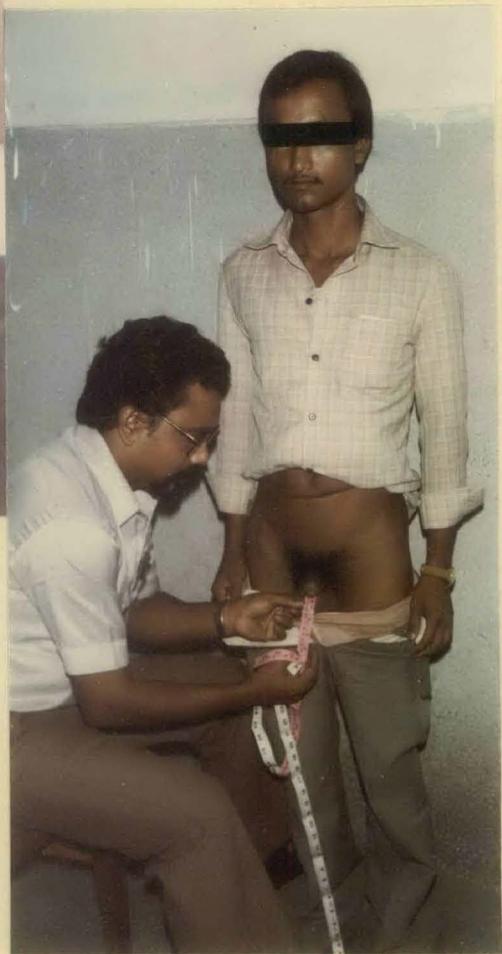
which follows the



**Fig.14** : Real measurement (in c.m.) of Flaccid Penis.



**Fig.15** : Real measurement (in c.m.) of Flaccid Penis of normal subjects, taken by Dr.S. Hui, M.S., Professor (upper) and Dr. B.Chakraborty, FRCS, Lecturer, Department of Surgery, N.B.Medical College.



**Fig.16** : Real measurement (in c.m.) of Flaccid Penis of Koro patients - taken by the author.

t distribution with  $n_1 + n_2 - 2$  d.f.

But under  $H_0 : \mu_1 = \mu_2$ , the test statistics becomes,

$$t = \frac{(\bar{x} - \bar{y}) \sqrt{n_1 + n_2 - 2}}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \sqrt{(n_1 - 1) s_1^2 + (n_2 - 1) s_2^2}} \quad \text{which follows the}$$

t distribution with  $n_1 + n_2 - 2$  d.f.

The null hypothesis  $H_0$  will be rejected if

$$|t| > t_{\alpha/2, n_1 + n_2 - 2}$$

Here  $\bar{x}$ ,  $\bar{y}$  are the sample means,  $\mu_1$ ,  $\mu_2$  population means;  $s_1$ ,  $s_2$  sample standard deviations and  $n_1$ ,  $n_2$  sample sizes.

## 2. Paired t test :

Let two variables ( $x$  and  $y$ ) be correlated. We want to test,  $H_0 : \mu_1 = \theta \mu_2$  (where  $\mu_1$ ,  $\mu_2$  are the population means for  $x$  and  $y$  respectively and  $\theta$  is some constant).

Then let  $z = x - \theta y$ , then the test statistic is,

$$t = \frac{\bar{z} \sqrt{n - 1}}{sz}, \quad \text{where } \bar{z} \text{ is the sample mean of } z, \text{ } sz \text{ is the}$$

sample standard deviation of  $z$  and  $n$  is the sample size.

This follows  $t$  with  $n - 1$  d.f.

The null hypothesis will be rejected if  $|t| > t_{\alpha/2, n-1}$ .

## 3. Correlation Coefficient :

Let  $x$  and  $y$  be two variables which are related to each other. Let there be  $n$  pairs of values of  $x$  and  $y$  and let these be,  $(x_1, y_1), (x_2, y_2) \dots \dots (x_n, y_n)$ .

$$r = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{\{n \sum x_i^2 - (\sum x_i)^2\} \{n \sum y_i^2 - (\sum y_i)^2\}}}$$

which lies between  $-1$  and  $+1$ .

4. The tabulated  $t$  values with level of significance ( $\alpha$ ) and with d.f. ( $n$ ) (i.e.  $t_{\alpha, n}$ ) are given below :

The tabulated  $t_{\alpha, n}$  values :

$t_{.005, 13} = 3.012$	$t_{.025, 13} = 2.160$
$t_{.005, 16} = 2.921$	$t_{.025, 16} = 2.120$
$t_{.005, 19} = 2.861$	$t_{.025, 19} = 2.093$
$t_{.005, 30} = 2.750$	$t_{.025, 30} = 2.042$
$t_{.005, 32} = 2.741$	$t_{.025, 32} = 2.040$
$t_{.005, 35} = 2.727$	$t_{.025, 35} = 2.031$
$t_{.005, 38} = 2.713$	$t_{.025, 38} = 2.025$
$t_{.005, 69} = 2.653$	$t_{.025, 69} = 1.997$
$t_{.005, 78} = 2.647$	$t_{.025, 78} = 1.994$

## RESULTS

### I. Perception of Normal Penile Length : Flaccid and Extended State.

All length measurements are in centimetres.

It is evident from the mean value distribution of the normal penis - flaccid state length measure of the groups (Table 1A) that Koro patients expressed the lowest length perception (4.58 cm.) while the normal group gave the highest measure (7.40 cm.). The result of the anxiety group is very close to that of Koro (5.32 cm.).

**Table 1A.** Distribution of penile length perception of normal penis - flaccid state of the group.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	4.24 (1.67)	4.93 (1.17)	4.58 (1.48)
Normal	7.32 (1.31)	7.48 (1.65)	7.40 (1.47)
Hydrocele	6.73 (1.05)	7.12 (1.13)	6.93 (1.06)
Scrotal filaria	6.74 (1.79)	6.90 (1.03)	6.85 (1.49)
Anxiety neurotics	5.11 (1.18)	5.53 (1.23)	5.32 (1.21)

A comparison of these measures in relation to the Koro situation (Table-1B) evinced that all the groups including their subsamples (i.e. rural and urban) differed significantly ( $P < 0.01$ ) in their perception from that of the Koro group. It is interesting to note that for the anxiety group, the rural and urban breakup showed no difference, though the total value is weakly significant only when 5% error is allowed.

**Table 1B.** Comparison of normal penis-flaccid state measure among the groups in relation to Koro.

	Rural t (df)	Urban t (df)	Total t (df)
Normal	6.49 (38)*	5.64 (38)*	8.55 (78)*
Hydrocele	5.65 (38)*	6.02 (38)*	8.16 (78)*
Scrotal filaria	4.60 (35)*	5.33 (32)*	6.41 (69)*
Anxiety neurotics	1.90 (38)	1.59 (38)	2.45 (78)**

\* $P < .01$ ; \*\* $P < .05$ .

The mean value distribution of normal penis - extended state length measure (Table 1C) also showed that Koro patients perceived the least length (5.27 cm.) and the normals highest (9.60 cm.). Here the anxiety group, unlike in the cases of the normal-flaccid length perception, evinced wide difference from the Koro group (8.03 cm.). A comparison of these perceptual measures in relation to Koro (Table-1D) showed that all the groups including their subsamples differed significantly ( $P < .01$ ) from those of Koro.

**Table 1C.** Distribution of penile length perception of normal penis-extended state of the groups.

	Rural $\bar{x}$ (sd)	Urban $\bar{x}$ (sd)	Total $\bar{x}$ (sd)
Koro	4.86 (1.62)	5.69 (1.24)	5.27 (1.50)
Normal	9.35 (1.87)	9.86 (2.18)	9.60 (2.05)
Hydrocele	7.92 (1.75)	8.46 (0.97)	8.19 (2.05)
Scrotal filaria	8.33 (1.41)	7.86 (0.92)	8.12 (1.20)
Anxiety neurotics	8.12 (1.93)	7.94 (1.62)	8.03 (1.76)

**Table 1D.** Comparison of normal penis - extended state measure among the groups in relation to Koro.

	Rural t (df)	Urban t (df)	Total t (df)
Normal	8.12 (38)*	7.44 (38)*	10.78 (78)*
Hydrocele	5.74 (38)*	7.97 (38)*	8.94 (78)*
Scrotal filaria	6.88 (35)*	5.84 (32)*	8.67 (69)*
Anxiety neurotics	5.79 (38)*	4.93 (38)*	7.55 (78)*

\*P < .01.

## II. Perception of Self Penile Length : Flaccid and Extended States.

The mean value distribution of self-penis- flaccid state measure of the groups showed (Table IIA) that the Koro group perceived the lowest length (3.94 cm) while normals the highest (8.36 cm).

**Table IIA.** Distribution of penile length perception of self penis-flaccid state of the groups.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	3.9 (1.17)	3.99 (1.23)	3.94 (1.20)
Normal	8.52 (0.92)	8.39 (1.36)	8.36 (1.11)
Hydrocele	7.25 (2.16)	7.36 (1.55)	7.30 (1.88)
Scrotal filaria	7.66 (1.46)	7.54 (1.51)	7.60 (1.49)
Anxiety neurotics	6.23 (1.06)	6.16 (1.02)	6.20 (1.03)

A comparison of these length perceptions in relation to Koro showed (Table IIB) that all the groups including their subsamples differed significantly ( $P < .01$ ) from those of Koro.

**Table IIB.** Comparison of self penis-flaccid state measure among the groups in relation to Koro.

	Rural t(df)	Urban t(df)	Total t(df)
Normal	13.28(38)*	10.73(38)*	17.10(78)*
Hydrocele	6.10(38)*	7.62(38)*	9.53(78)*
Scrotal filaria	8.69(35)*	7.54(32)*	11.49(69)*
Anxiety neurotics	6.40(38)*	6.07(38)*	9.04(78)*

\*P &lt; .01

Exactly a similar picture is evident in the distribution of mean values of self penis - extended state measure (Table IIC) and their comparisons in relation to Koro (Table IID).

**Table IIC.** Distribution of penile length perception of self penis-extended state of the groups.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	4.14(1.14)	4.24(1.19)	4.14(1.16)
Normal	9.97(1.24)	9.80(1.39)	9.88(1.34)
Hydrocele	8.77(1.45)	8.36(1.34)	8.56(1.43)
Scrotal filaria	8.51(1.66)	8.46(1.46)	8.49(1.53)
Anxiety neurotics	8.33(1.79)	8.48(1.26)	8.40(1.56)

A comparison of the change of measure from the flaccid to the extended state penile length perception of the groups showed (Table-IIE) that the difference in these two measures in all the groups is statistically highly significant ( $P < .01$ ) except the Koro-rural and urban sample, which individually showed no significant difference in this changed penile-state length perception, and the scrotal filaria-urban sample showed weak significance, i.e. only when 5% error is allowed. Moreover, the comparison of the differential increment

of length measure from the flaccid state to the extended state of all the groups in relation to that of Koro showed (Table IIF) a significant difference ( $P < .01$ ) in all the groups in their total values from that of Koro. Hydrocele-urban showed weak significance ( $P .05$ ) and scrotal filaria - urban showed no significance.

**Table IIE.** Comparison of change of measure from self flaccid to self extended penile length perception of each group using the paired t test.

	Rural t(df)	Urban t(df)	Total t(df)
Koro	1.74(19)	1.76(19)	4.26(39)*
Normal	7.41(19)*	4.33(19)*	6.86(39)*
Hydrocele	4.98(19)*	3.35(19)*	5.96(39)*
Scrotal filaria	4.59(16)*	2.61(13)**	4.57(30)*
Anxiety neurotics	8.03(19)*	9.36(19)*	12.27(33)*

\* $P < .01$ ; \*\* $P < .05$

**Table IIF.** Comparison of the differential increment in the perceived penile length measure from the flaccid to the extended state of the groups in relation to Koro.

	Rural t(df)	Urban t(df)	Total t(df)
Normal	-6.55(38)*	-3.35(38)*	-5.52(78)*
Hydrocele	-4.49(38)*	-2.33(38)**	-4.36(78)*
Scrotal filaria	-3.82(38)*	-2.02(32)	-3.10(69)*
Anxiety neurotics	-7.35(38)*	-7.43(38)*	-9.99(78)*

\* $P < .01$ ; \*\* $P < .05$ .

An analysis of the correlation coefficient of these two measures (flaccid and extended) among the groups showed (Table IIG) that in Koro there exists a good correlation between these two perceptions. Total as well as urban values of the normals, on the otherhand,

are rather uncorrelated. All the other groups showed good correlation between these two perceived measures.

**Table IIG.** Correlation coefficient of perceived penile length measures between the flaccid and the extended state.

	Rural	Urban	Total
Koro	0.96	0.87	0.91
Normal	0.63	0.47	0.52
Hydrocele	0.80	0.61	0.71
Scrotal filaria	0.89	0.62	0.78
Anxiety neurotics	0.79	0.57	0.67

### III. Measurement of the Real Length of the Penis - Flaccid state of the groups

It is evident from the distribution of mean values of the real flaccid penis length of the groups (Table IIIA) that the penis length of Koro is not only almost similar to that of normals but in fact is longer than that of the other groups.

**Table IIIA.** Distribution of real flaccid-penis length of the groups.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	6.93(1.20)	7.22(1.13)	7.07(1.19)
Normal	8.48(1.49)	7.82(1.24)	8.15(1.40)
Hydrocele	6.61(1.41)	6.44(1.44)	6.52(1.43)
Scrotal filaria	6.53(1.83)	6.14(1.00)	6.33(1.52)
Anxiety neurotics	6.77(1.65)	6.90(1.27)	6.83(1.48)

A comparison of these real lengths in fact showed (Table-III B) that only the normal - rural and total measurements are signifi-

cantly ( $P < .01$ ) smaller than that of Koro. The smaller length in scrotal filaria and anxiety groups' total values are weakly significant, only if 5% error is allowed. All the other groups showed no statistically significant difference in real flaccid length of penis from that of Koro.

**Table IIIB.** Comparison of real length of penis-flaccid state of the groups in relation to Koro.

	rural t(df)	Urban t(df)	Total t(df)
Normal	3.62(38)*	1.6(38)	3.72(78)*
Hydrocele	-0.77(38)	-1.91(38)	-1.87(78)
Scrotal filaria	-0.84(35)	-2.80(32)*	-2.22(69)**
Anxiety neurotics	-0.35(38)	-0.84(38)	-2.66(78)**

\* $P < .01$ ;    \*\* $P < .05$

#### IV. Real Flaccid Penile Length versus Perceived Self Flaccid Penile measure.

The distribution of the total mean value difference between the real and the perceived lengths of self penis - flaccid state measure of the groups showed (Table IVA) that the Koro group perceived less penile length than actuality (-3.13 cm). In the anxiety group this trend is also seen but to a much lesser degree (-.63 cm). All the other groups interestingly showed little bit increased length perception regarding their penis than what they really have. Table-IVB shows the subsample-wise mean value distribution of this difference among the groups.

A comparison of this difference in the two measures among the groups also showed (Table IVC) that the Koro group differed significantly ( $P < .01$ ) in this respect. Normal and hydrocele groups did not show any significant difference between the real and the perceived lengths. On the other hand, Koro - rural, urban and total and scrotal filaria - urban and total values showed significant differ-

**Table IVA.** Distribution of total mean values of real and perceived penile length - flaccid state of the groups.

	Real Measure $\bar{x}$ (sd)	Perceived Measure $\bar{x}$ (sd)	Change in Measure $\bar{x}$ (sd)
Koro	7.07(1.19)	3.94(1.20)	-3.13(1.77)
Normal	8.15(1.40)	8.36(1.11)	+0.21(1.72)
Hydrocele	6.52(1.43)	7.30(1.88)	+0.78(2.23)
Scrotal filaria	6.33(1.52)	7.60(1.49)	+1.56(1.61)
Anxiety neurotics	6.83(1.48)	6.20(1.03)	-0.63(1.78)

**Table IVB.** Distribution of the differences in measure between real and perceived penile lengths of the groups.

	Rural $\bar{x}$ (sd)	Urban $\bar{x}$ (sd)	Total $\bar{x}$ (sd)
Koro	3.03(1.98)	3.23(1.56)	3.13(1.77)
Normal	0.16(1.66)	-0.57(1.74)	-0.21(1.72)
Hydrocele	-0.64(2.35)	-0.92(2.15)	-0.78(2.23)
Scrotal filaria	-1.13(1.85)	-1.40(1.31)	-1.25(1.61)
Anxiety neurotics	0.54(2.20)	0.74(1.26)	0.63(1.78)

ence ( $P < .01$ ) between these two length perceptions. Scrotal filaria-rural and anxiety group - urban and total values showed significance if only 5% error is allowed.

**Table IVC.** Comparison of the different in measure between real and perceived penile length - flaccid state among the groups using paired t test.

	Rural t(df)	Urban t(dt)	Total t(df)
Koro	6.67(19)*	9.03(19)*	11.14(39)*
Normal	0.42(19)	-1.43(19)	-0.76(39)
Hydrocele	-1.19(19)	-1.87(19)	-2.18(39)
Scrotal filaria	-2.44(16)**	-3.86(13)*	-4.25(30)*
Anxiety neurotics	1.07(19)	2.56(19)**	2.21(39)**

\*P < .01; \*\*P < .05

## V. Intra-perceptual comparison of Normal and Self Penile Length Measurements

### VA. Flaccid Penile Length Perception : Normal versus Self.

The distribution of the total mean value differences in the change of measure between the normal and the self flaccid penile lengths of the group showed (Table VA.1) that only the Koro group perceived less self penile length (-.64 cm) than that of the normal. All the other groups showed increased self-length perception, being highest in the normal group followed by the anxiety group. Table-VA.2 shows the subsample-wise distribution of this difference in measure among the groups.

**Table VA.1.** Distribution of the total mean values and their differences for normal and self flaccid penile length perceptions of the groups.

	Flaccid State Measurement		
	Normal Penis	Self Penis	Difference
Koro	4.58	3.94	-0.64
Normal	7.40	8.36	+0.96
Hydrocele	6.93	7.3	+0.37
Scrotal filaria	6.85	7.60	+0.75
Anxiety neurotics	5.32	6.20	+0.88

**Table VA.2.** Distribution of the differences of measure between normal and self flaccid penile length perceptions of the groups.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	0.34(1.76)	0.94(1.49)	0.64(1.63)
Normal	-1.00(1.14)	-0.91(1.44)	-0.96(1.28)
Hydrocele	-0.52(2.15)	-0.24(1.70)	-0.37(1.92)
Scrotal filaria	-0.92(1.51)	-0.55(1.55)	-0.75(1.61)
Anxiety neurotics	-1.12(1.49)	-0.63(2.82)	-0.88(2.24)

A group-wise comparison of this difference in measure between the normal and the self flaccid penile lengths also showed (Table VA.3) that the difference is significant ( $P < .01$ ) in normal rural and total, and anxiety-rural groups. The difference in Koro-urban and total, however, showed significance only when 5% error is allowed as did the normal-urban, scrotal filaria - rural and total, and anxiety - total groups. Koro - rural and Hydrocele showed no significant difference in these two perceptions.

**Table VA.3.** Comparison of the differences in measure between normal and self flaccid penile length perceptions of the groups by using the paired t test.

	Rural t(df)	Urban t(df)	Total t(df)
Koro	0.84(19)	2.75(19)**	2.45(39)**
Normal	-3.82(19)*	-2.75(19)**	-4.68(39)**
Hydrocele	-1.05(19)	-0.62(19)	-1.20(39)
Scrotal filaria	-2.44(16)**	-1.28(13)	-2.55(30)**
Anxiety neurotics	-3.28(19)*	-0.97(19)	-2.45(39)**

\*P < .01; \*\*P < .05

A comparison of the incremental difference of self-penis measure of the groups in relation to Koro showed (Table VA.4) that in normal, scrotal filaria - urban and total, and anxiety - rural and total groups, this difference is significant ( $P < .01$ ).

**Table VA.4.** Comparison of the incremental differences in measure from normal flaccid to self flaccid penile length perceptions of the groups in relation to Koro.

	Rural t(df)	Urban t(df)	Total t(df)
Normal	2.86(38)*	3.99(38)*	4.88(78)*
Hydrocele	1.38(38)	2.33(38)	2.54(78)
Scrotal filaria	2.31(35)	2.82(32)*	3.58(69)
Anxiety neurotics	2.83(38)*	2.20(38)	3.47(78)*

\*P < .01

VB. Extended Penile Perception : Normal versus Self.

The distribution of the total mean value differences in the change of measure between the normal and the self extended penile length of the groups similarly showed (Table VB.1) that only Koro group perceived less self penile length (-1.13 cm) than that of the normal persons. All the other groups, on the contrary, perceived more self penile length than that of the normal person. Table VB.2 shows the subsample-wise distribution of this difference in measure of the groups.

**Table VB.1.** Distribution of the total mean values and their difference for normal and self extended penile length perceptions of the groups.

	Extended State Measurement		
	Normal Penis	Self Penis	Difference
Koro	5.27	4.14	-1.13
Normal	9.60	9.88	+0.28
Hydrocele	8.19	8.56	+0.37
Scrotal filaria	8.12	8.49	+0.37
Anxiety neurotics	8.03	8.40	+0.37

**Table VB.2.** Distribution of the differences in measure between the normal and the self extended penile length perception of the groups.

	Rural $\bar{x}(sd)$	Urban $\bar{x}(sd)$	Total $\bar{x}(sd)$
Koro	0.82(1.94)	1.45(1.87)	1.31(1.91)
Normal	-0.62(2.02)	0.06(2.32)	-0.28(2.17)
Hydrocele	-0.85(2.04)	0.10(1.54)	-0.37(1.85)
Scrotal filaria	-0.18(1.31)	-0.60(1.48)	-0.37(1.37)
Anxiety neurotics	-0.21(1.77)	-0.54(1.96)	-0.37(1.85)

A group-wise comparison of this difference of measure between the normal extended and the self extended penile length perception also showed (Table VB.3) that this difference in Koro-urban and total is highly significant ( $P < .01$ ). In all the remaining groups this difference is insignificant, but the incremental difference in the measure, on the otherhand, is significant ( $P < .01$ ) in all the groups when compared with that of the Koro group (Table VB.4).

**Table VB.3.** Comparison of the differences in measure between normal and self extended penile length perceptions of the groups by using the paired t test.

	Rural t(df)	Urban t(df)	Total t(df)
Koro	1.84(19)	3.98(19)*	3.69(39)*
Normal	-1.34(19)	0.11(19)	-0.80(39)
Hydrocele	-1.82(19)	0.28(19)	-1.25(39)
Scrotal filaria	-0.55(16)	-1.46(13)	-1.48(30)
Anxiety neurotics	-0.52(19)	-1.20(19)	-1.25(39)

\* $P < .01$

**Table VB.4.** Comparison of the incremental differences in measure from normal extended to self extended penile length perceptions of the groups in relation to Koro.

	Rural t(df)	Urban t(df)	Total t(df)
Normal	2.30(38)	2.09(38)	3.08(78)*
Hydrocele	2.65(38)	2.49(38)	3.57(78)*
Scrotal filaria	1.80(35)	3.57(32)*	3.69(69)*
Anxiety neurotics	1.75(38)	3.29(38)*	3.47(78)*

\* $P < .01$

## DISCUSSION

Quite a few important findings on the penis-image perception of Koro patients came out of this investigation.

1. The Koro patient perceives reduced penile length, be it the penis of a normal person or of his own. This 'reduced length' perception was common for both the penile states, i.e. flaccid and extended.
2. The Koro patient fail to perceive effectively the morphological kinetics of penile state changes, i.e. from flaccid to extended state.
3. Contrary to their perception of 'small penis', in reality such patients possess that penile length which not only is almost similar to that of a normal person but is even longer than those of the other patient groups.
4. The Koro patient perceives reduced length of own penis, of both flaccid and extended states, than their own perception of similar penis conditions of a normal person.

Hence, to summarize, the perception of smallness of penis, i.e., reduced penile length, in spite of reality, is the basic body (organ)-image disturbance in Koro. This disturbance is evident in both trait and state penis perceptions. Both urban and rural Koro patients equally shared this perceptual distortion.

This disturbed penis-image in Koro is comparable with the disturbed body-image found in dysmorphophobia. In dysmorphophobic patients, there is a fundamental disturbance in psychological body-image and the usual areas of concern are the face, hair, genital organs and breasts (Conolly & Gipson, 1978). Undue concern with a body part in spite of the lack of any pathology is the central perceptual disturbance in these cases. Woman who complain of hair loss which seems to be disproportionate to the objective degree of alopecia present (Eckert, 1975); false perception of some nasal morphology in some schizophrenics (Conolly & Gipson, 1978) even leading to rhinoplasty (Gopalakrishnan & Neki, 1985);

obsessive preoccupation with the perception of "changed" body parts leading to delusions (Stekel, 1950); changed perceptions of body shape, size or part(s) at the initial phase of psychotic process (Bychowski, 1943; Hay, 1970); dermatological symptomatology in the absence of any skin pathology in some psychiatric patients (Sneddon, 1979; Hardy & Cotterill, 1982) and body-image dissatisfaction of psoriatic patients (Seville, 1977) - all are clinical examples of dysmorphophobic perceptual disturbances.

The concept of an altered body-image has been in the literature on eating disorders for over three decades (Bruch, 1962) and in the research on obesity for even longer (Collins et al., 1987). The patients' persistent preoccupation that they are of normal weight or overweight, against clear objective evidence to the contrary, led Bruch (1962) to state that the misperception reaches "delusional proportions". A number of studies of body size perception in anorexia nervosa have found that the patients overestimate their body size (Slade & Russell, 1973; Crisp & Kalucy, 1974; Casper et al., 1979; Whitehouse et al., 1986). Similarly, in case of bulimia and bulimia nervosa, the patients overestimate body size to a greater degree than controls (Freeman et al., 1984; Cooper & Taylor, 1988). Moreover, the obese person sees him or her body image as grotesque and loathsome and perceives that other persons view him or her with contempt and hostility. It is noted that a high incidence of neurotic locus is associated with such body-image disturbances (Stunkard, 1975).

Perception of venereal disease and consequent penile change is another such example (Oates & Gomez, 1984). It was reported in one study that 5% of 887 consecutive new patient attendance of a venereal clinic had the perception of penile involvement without any real pathology or clinical finding except the presence of a high level of anxiety (Kite & Grimble, 1963). Similarly, the complaint of discomfort in and around genitalia in the absence of any detectable organic pathology, called psychogenic urethritis, is related to defective sex organ perception and its consequent emotional impact (King et al., 1980).

An individual's concept of his body-image may provide a context for predicting some dimensions of the physiological reactivity (Fisher & Cleveland, 1957; Fisher, 1959). The concept of altered penile morphology may be viewed as a triggering factor for the acute anxiety reaction centred around the Koro phenomenon. Though the profile of penile perceptions was obtained after the Koro attack, the DAPT can be regarded as the learned organ-image disposition of the patients which they expressed in the drawings. Similar projective exploration of a conceptual model regarding sex-role is reported from the manifestations in terms of relative size of male and female figure drawings (Fisher, 1965). Interesting to note that the only one such attempt of perceptual exploration of body image in Koro (Arbitman, 1975) by Draw-a-person test revealed that the patient had a poor male sexual identification as was evinced from the sketch with no face, incomplete extremities and no genitals.

Therefore, the importance of this body-image context in Koro lies in the fact of the patients' penile perception, viz. the perception of below average penis length and this may be the central psychodynamic factor that influences their Koro vulnerability. This illusion of genital deprivation in Koro is discussed by Yap (1965a) as a form of depersonalization, which Trethowan (1963) states "as interior imagination" of castration anxiety. Of course, the reactivity in this body sector (penis) involves multiple socialization. Experiences including body or organ meaning and associated paradigm of body representation (Freud, 1938; Fenichel, 1945; Fisher & Abercrombie, 1958). An individual's expectations, sets and wishes selectively influence the reactivity of the various parts of his body (Alexander & French, 1948; Karush et al., 1955). The social cognition of value-loading on the appendage of masculinity (i.e. penis) and its consequent perceptual process in Koro is a further research area that will highlight the psychological background of the distorted penis-image perception.

The feelings a person has towards his different body parts are central to the concept he has of himself and the ego-integration, which help to maintain a realistic body perception. As Bender

(1934) states, "There should be no discrepancy between the body-image and the body structure....." The penile-image measurement in Koro may simply reflect the underlying perceptual disturbances or associated psychosexual conflicts or it may also be possible that the Koro illness creates such a damaging impact on the penis-image perception. Longitudinal perceptual studies concerning penis image may only offer this explanation. But whatever the case, the one most important information obtained from this DAPT investigation is how the Koro patients perceive the image of their symptom-arousing body part.

## PENILE PERCEPTION OF KORO PATIENTS

### B. Penis Root Perception

#### SUMMARY

Koro is an acute anxiety reaction in which the perception of decreased penis length because of intra-abdominal traction is the main feature. This study attempts to explore the penis-root perception of the Koro patients by a graphomotor projective test—the Draw-a-penis Test (DAPT). This controlled DAPT investigation shows that Koro patients perceived the penis as a detached organ with root-boundary definiteness as evidenced from their close penis-root perception. They also displayed a smaller volumetric perception of penis-root than that of the normal subjects. These perceptual deviations in penis-root image are discussed in relation to their Koro vulnerability.

#### INTRODUCTION

Schilder (1935) defined body image as "the picture of our own body which we form in our mind, that is to say the way in which our body appears to ourselves". Psychoanalytically, body image is viewed as the internalised body representation, both as a whole and as its component parts, within the inner world of the individual (Sandler & Rosenblatt, 1962). The body or organ image concept is an important frame of reference that significantly influences the pattern of symptom localization and mode of symptom expression (Fisher & Cleveland, 1958). Fisher (1963) postulated a barrier score for boundary definiteness that differentiates individuals in the degree to which they perceive their body boundary as definite and firm or indefinite and weak. The body boundary concept has been implicated in personality functioning and the site of psychosomatic symptoms (Fisher & Cleveland, 1958; Kalick,

1982). External body percepts (perception of the various parts of the body) and the extraneous body image (way of perceiving other person) - both have symbolic meaning of clinical concern (Vander Velde, 1985; Gerstman, 1958). Both the body images have two components : a physical dimension and a psychological significance (Benthall & Polhemus, 1975; Fast, 1970).

Koro is an acute anxiety state in which the perception of reduced penis length because of retraction from intra-abdominal traction is the main psychopathology. In previous chapter, I have focussed on the dysmorphophobic perception of reduced penis length of Koro patients. This study was devoted to another special dimension of penis image : the nature of the penis-root perception. Penis-root perception is an important factor for the Koro patients because this is the junctional site between body and penis, and they believed that the malevolent intra-abdominal "pull" was operative at this site. The volumetric perception of the penis-root width is important in reference to their penis image also.

### **MATERIALS AND METHODS**

#### **Sample :**

Forty single male Koro patients were taken by random sampling without replacement from a sample pool of 77 cases of North Bengal Koro epidemic (Chowdhury et al., 1988). Four control groups, matched for age, marital status and education were taken for comparison. These are normal subjects, patients with hydrocele, with scrotal filaria and with anxiety neurosis, the details of which is reported in the previous chapter.

#### **Instrument :**

The Draw-a-penis Test (DAPT), the details of which is described in the previous chapter.

Penis root drawing displayed two types of roots - close root, where the two shaft lines are joined, and the open root,

where the two lines are not joined and the distance between the end points of these two root lines is expressed as open root measure (in cm) (Fig.1).

The time interval between Koro attack and DAPT administration was 8-21 days, mean 14 days.

Paired t and Student's t and Tau tests were used for statistical analysis of DAPT measurements.

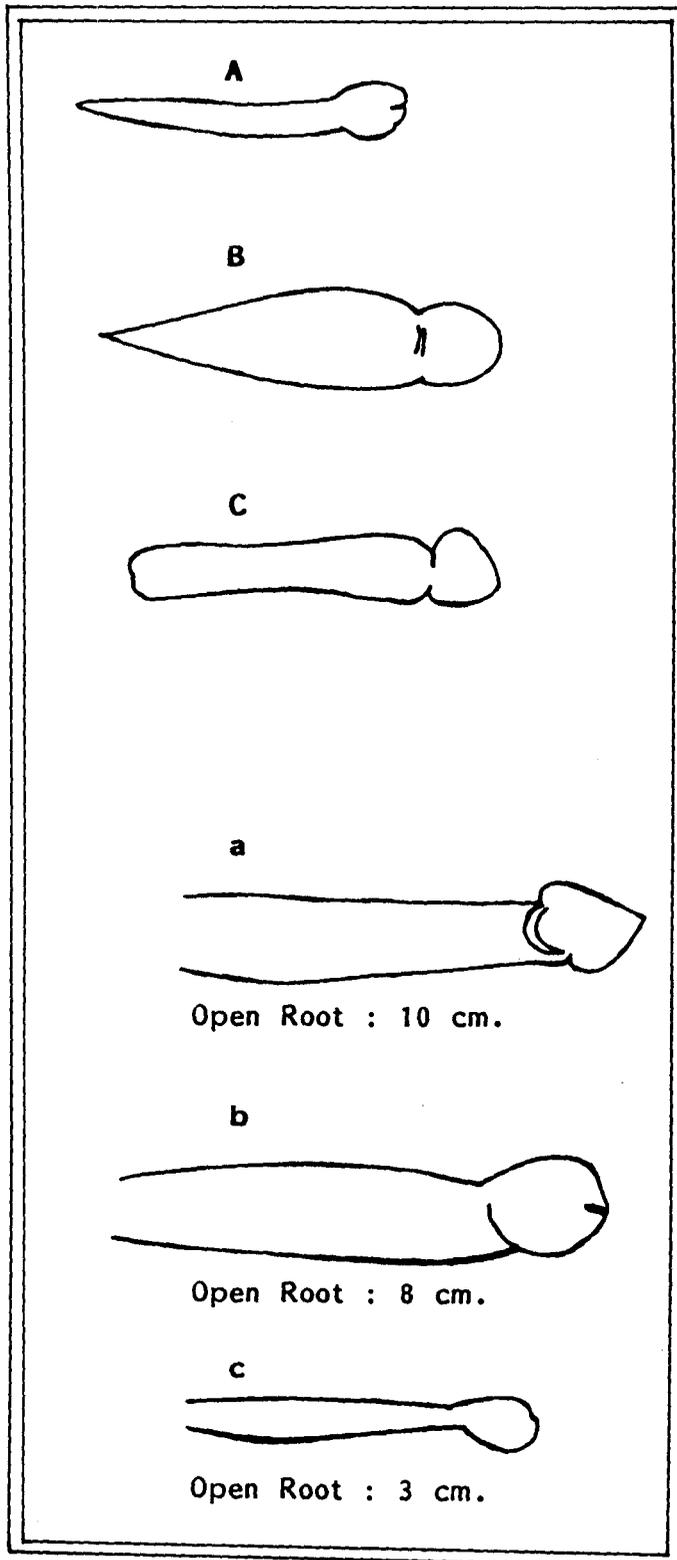
## RESULTS

Table 1 and 2 shows the root perception of penis of a normal person of the groups, both flaccid and extended states, respectively. In flaccid state root perception, Koro patients displayed significantly more close roots than the controls did. In the extended penis root, however, they perceived significantly ( $P < .01$ ) more close root than did the normal and hydrocele group only. In both the penile states the measure of the open root in Koro is significantly less than the controls.

**Table 1.** Root perception of 'normal penis flaccid state' of the groups.

	Close Root(A)	Open Root(B)	A Vs. B	Open Root Measure	
	%	%		Mean(sd)	t(df)
Koro	50	50		0.7(0.4)	
Normal	12.5	87.5	3.62*	1.3(0.5)	-4.51(53)*
Hydrocele	20	80	2.81*	1.1(0.5)	-2.85(50)*
Scrotal filaria	19.4	80.6	2.67*	1.1(0.5)	-2.27(43)**
Anxiety neurotics	27.5	72.5	2.06**	0.9(0.3)	-2.17(47)**

\* $P < .01$ ; \*\* $P < .05$



**Fig.1. DAPT Root Measurement (Own Penis - Flaccid State).**

**A,B,C** = Closed Root drawing of Koro, Hydrocele & Anxiety-neurosis cases.

**a,b,c** = Open Root drawing of Scrotal filaria, Normal subject and Koro cases.

**Table 2.** Root perception of 'normal penis extended state' of the groups.

	Close Root(A) %	Open Root(B) %	A Vs. B	Open Root Measure	
				Mean(sd)	t(df)
Koro	45	55		0.8(0.3)	
Normal	17.5	82.5	2.65*	1.5(0.5)	-6.16(53)*
Hydrocele	20	80	2.39*	1.1(0.4)	-3.40(52)*
Scrotal filaria	25.8	74.2	1.65	1.2(0.5)	-3.28(43)*
Anxiety neurotics	30	70	1.09	1.0(0.3)	-2.93(48)*

\*P < .01

In the perception of own penis root, in both penile states (Table 3 & 4), Koro patients perceived significantly more close root than the controls did. In measuring the open root for all penile states, both normal and own penis, Koro patients perceived significantly less root-width than the controls did.

**Table 3.** Root perception of 'own' penis flaccid state of the groups.

	Close Root(A) %	Open Root(B) %	A Vs. B	Open Root Measure	
				Mean(sd)	t(df)
Koro	57.5	42.5		0.5(0.4)	
Normal	7.5	92.5	4.78*	1.2(0.4)	-4.39(52)*
Hydrocele	22.5	77.5	3.18*	0.9(0.4)	-3.76(46)*
Scrotal filaria	32.3	67.7	2.11**	0.9(0.3)	-4.31(46)*
Anxiety neurotics	17.5	82.5	3.70*	0.9(0.4)	-3.48(48)*

\*P < .01; \*\*P < .05

**Table 4.** Root perception of 'own' penis extended state of the groups.

	Close Root(A) %	Open Root(B) %	A Vs. B	Open Root Measure	
				Mean(sd)	t(df)
Koro	45	55		0.8(0.4)	
Normal	7.5	92.5	3.83*	1.2(0.4)	-6.73(57)*
Hydrocele	12.5	87.5	3.21*	1.1(0.4)	-3.18(55)*
Scrotal filaria	16.1	83.9	2.57**	1.0(0.3)	-3.27(46)*
Anxiety neurotics	12.5	87.5	3.22*	1.0(0.3)	-2.15(55)*8

\*P < .01; \*\*P < .05

### DISCUSSION

The body (organ) image is the mental representation of physical self and is intimately related with the psychological self of an individual. The conceptual composite of one's sexual organ image has manifold influences on the functional aspect of sexuality and has an intimate relation with varieties of psychological pathologies (Greenacre, 1953; Chowdhury, 1989e). The present finding of penis root perception of Koro patients is important in this respect.

In this study, Koro patients show significant differences in their penis-root perception in two ways. First, they perceived the penis as a self-defined appendage attached to the body as is evident from their "close" root drawing with penis-boundary definiteness, having no continuation with the body line. This "detached" organ perception probably projects their concept of vulnerable body-penis junction where the "malevolent" indrawing force is operative to "engulf" the whole penis within the abdomen. Many Koro patients also expressed their firm conviction of the penis as a separate organ because of their observation of "inability to push back the erect penis into the abdomen". During clinical exami-

nation, all these patients expressed their concern about this body-penis junction (penis root) because the intra-abdominal penile dissolution occurred through this site. It is this very cognition also that was reflected in the social treatment ritual they practised during the Koro attack: pressing or fastening the penis-root with rope or wire for manual penile traction (Chowdhury, 1990c).

The second finding is the patients' perception of narrow penis-root width. This perception is supportive of their dysmorphic penile cognition of a "small penis" (Chowdhury, 1989a; b), which might influence the sexual organ orientation that facilitated their Koro vulnerability. It too is of clinical interest to note that the Koro patients have these perceptual deviations also for their extraneous penis root image. The psychodynamic significance of volumetric perception has also been reported in relation to breast size, Chest width and feminine sexual orientation (Hollyman et al., 1986). The present study thus explored one pathoperceptual dimension of penis image - penis-root and root-width, of the Koro patients.

## PENILE PERCEPTION OF KORO PATIENTS

### C. Penis Shaft Perception

#### SUMMARY

Koro is an acute anxiety reaction in which the perception of decreased penis length because of intrabdominal traction is the main feature. This study attempts to explore the penis shaft perception of the Koro patients by a graphomotor projective test - DAPT (Draw-a-penis test). This controlled DAPT investigation shows that Koro patients perceived reduced volumetric penis-shaft dimension, viz. less 'maximum shaft-width' than that of the controls. This perceptual deviation in penis-shaft image is discussed in relation to the vulnerability of Koro patients.

#### INTRODUCTION

An individual's concept of his body-image influences his behaviour (Cassel, 1965). The implications of body-image boundary perception and its correlation with psychosomatic symptomatology and physiological reactivity have been explored in many studies (Fisher, 1963; Hollyman et al., 1986). Sexual organ-image occupies a potential role in the manifestation of psychosexual pathology (Fisher & Cleveland, 1958; Greenacre, 1953). Studies with Koro, a form of sexual panic state, reveal that patients have perceptual deviations in their penis image, viz. penis length (Chowdhury, 1989a) and penis root (Chowdhury, 1991c). As the central psychopathology in Koro (male form) is the perception of penile shortening with accompanied anxiety, the penis image perception may have a role in the patients' predisposition to Koro vulnerability.

Penis is a dynamic organ that experiences shrinkage as well as expansions (Bancroft, 1974). The morphological volumetric changes of penis size in this process are remarkable. The dynamism of penis shaft in these penile state changes is crucial. The

present study attempts to explore the perception of shaft volume, viz. the maximum shaft-width of penis, during both flaccid and extended states, of Koro patients. The study of 'extraneous' penis-shaft image (way of perceiving that of others) is also done to examine the perceptual difference between "patients' own" and "normal" penis shaft-width cognition.

## **MATERIALS AND METHODS**

### **Sample :**

Forty single male Koro patients were taken by random sampling without replacement from a sample pool of 77 cases of North Bengal Koro epidemic (Chowdhury et al., 1988). Four control groups, matched for age, marital status and education were taken for comparison. These are normal subjects, patients with hydrocele, with scrotal filaria and with anxiety neurosis (ICD 9 Code: 300.0; WHO, 1978), the details of which are discussed in the previous chapter.

### **Instrument :**

Draw-a-penis Test (DAPT) is a grapho-motor projective test devised to elicit the penis perception of the drawer, where he was asked to draw the exact penis of a normal person (of his age) and of himself (Chowdhury, 1989f). In each instance, the drawer was asked to draw two morphologically different penis images : flaccid penis and penis during sexual arousal (extended state). The maximum width of the penis-shaft is the measurement in centimetre of the line joining the two opposite maximally situated points on the shaft line (Fig.1).

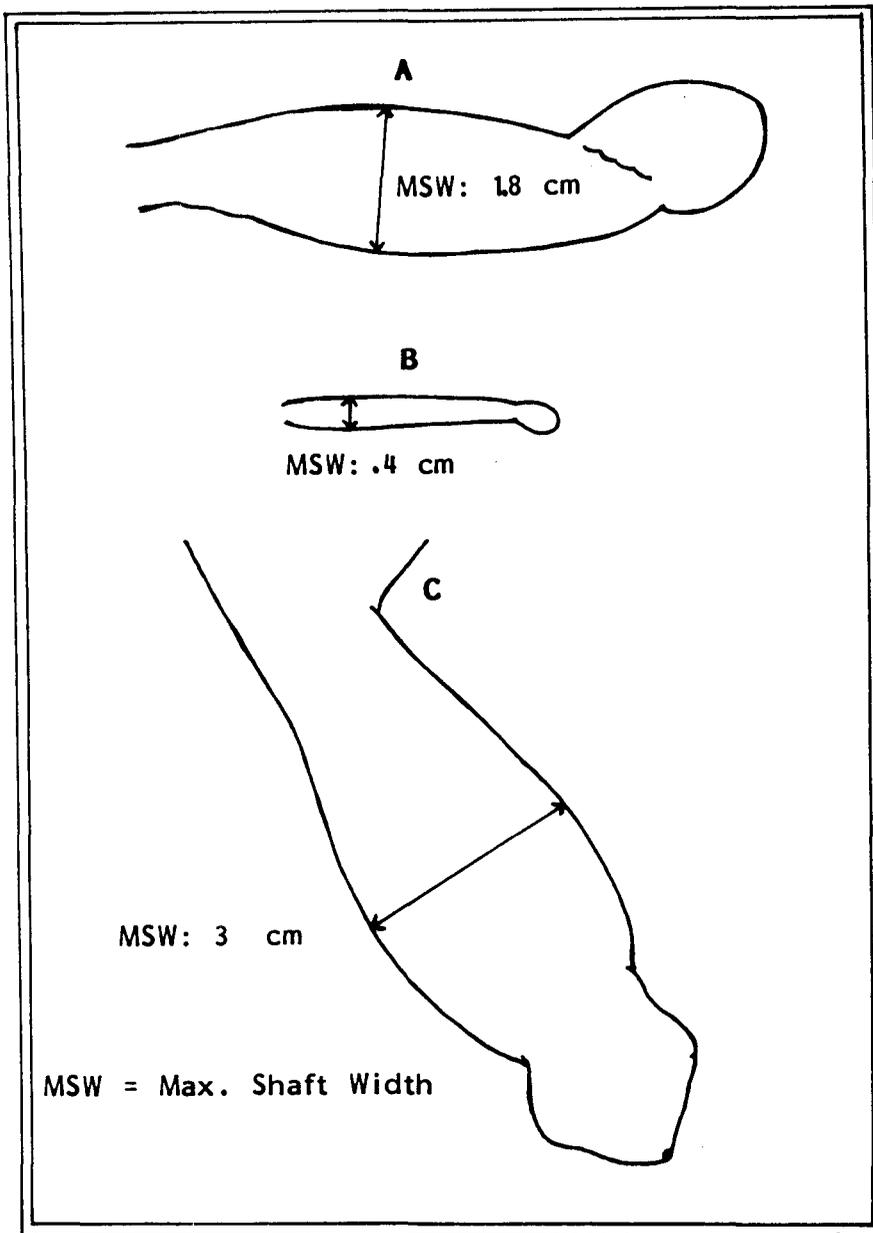
The time interval between Koro attack and DAPT administration was 8-21 days, mean 14.2 days.

A statistical analysis of the DAPT score was done by using Student's 't' test.

## **RESULTS**

Shaft-width perception of 'normal' penis :

Table 1 shows the mean DAPT values of the maximum shaft-width perception of 'normal' penis, both flaccid and extended.



**Fig.1. DAPT - Shaft Measurement (Own Penis Extended State).**

**A :** Drawing of a Scrotal filaria case.

**B :** Drawing of a Koro case.

**C :** Drawing of a normal person.

In both the penis state drawings, Koro patients expressed significantly ( $P < .01$ ) less shaft-width perception than that of the control groups.

**Table 1.** Perception of 'Maximum Penile Shaft-width' on DAPT for normal penis

	Flaccid State			Extended State		
	$\bar{X}$	sd	t(df)	$\bar{X}$	sd	t(df)
Koro	0.64	0.25		0.77	0.24	
Normal	1.13	0.37	-9.9(78)*	1.35	0.36	-8.5(78)*
Hydrocele	1.04	0.33	-6.1(78)*	1.17	0.36	-5.9(78)*
Scrotal Filaria	0.92	0.33	-4.1(69)*	1.04	0.21	-4.9(69)*
Anxiety Neurosis	0.85	0.36	-3.0(78)*	0.96	0.20	-3.9(78)*

\* $p < .01$

Shaft-width perception of 'own' penis :

Table-2 shows the mean DAPT values of 'own' penis shaft-width perception for both the penile states. Koro patients here expressed significantly ( $P < .01$ ) smaller shaft-widths in flaccid state than those of all the controls. In the extended penis state similarly Koro patients displayed significantly less shaft-width perception than that of all the controls except the anxiety neurosis group.

**Table 2.** Perception of 'Maximum Penile Shaft-width' on DAPT for self penis.

	Flaccid State			Extended State		
	$\bar{X}$	sd	t(df)	$\bar{X}$	sd	t(df)
Koro	0.62	0.24		0.87	0.22	
Normal	1.07	0.32	-7.1(78)**	1.23	0.38	-5.2(78)**
Hydrocele	1.0	0.27	-6.7(78)**	1.18	0.50	-3.6(78)**
Scrotal Filaria	0.97	0.28	-5.7(69)**	1.02	0.38	-2.1(69)*
Anxiety Neurosis	0.82	0.28	-3.4(78)**	0.91	0.23	-0.8(78)

\*\* $p < .01$ ; \* $p < .05$

## DISCUSSION

The organ image of a person may provide a context for predicting some important dimensions of his psychophysiological reactivity (Fisher & Fisher, 1964). The present finding of penis image, viz. penis-shaft of Koro patients is important in this context. The conceptual frame of reference of one's sexual organ image has several influences on the functional aspect of sexuality and has a very close relation with varieties of psychosexual pathogenesis (Greenacre, 1953). Perception of shaft volume is an important component of penis image and contributes to the concept of penis size, shape and symbolic vitality and stands as a marker of biopsychological sexual identity of masculinity. The psychological construct of male sexuality is emotionally charged with the penis configuration, as the female adolescent and youth identity incorporates the perception of breast size and shape. Koro patients clearly displayed their perceptual deviations in the cognition of shaft-width in comparison to those of the normal subjects and other patient groups. This perceptual deviation is also observed in the two penile states: i.e. flaccid and extended. Only the anxiety neurotics have some resemblance with the Koro patients' perception of extended 'own' penis and this similarity is indicative of a common nucleus of anxiety relating to sexuality.

This reduced volumetric penis shaft perception in Koro may be viewed as one of the contributing factors in triggering the patients' anxiety reaction centred around Koro phenomena, in addition to their shorter penis length perception (Chowdhury, 1989a). The present finding is also supportive of their dysmorphic penile morphological cognition of a "small penis" (Chowdhury, 1989b), which may influence the sexual organ image that enhanced their Koro vulnerability with concomitant expression of sexual anxiety.

## **PENILE PERCEPTION OF KORO PATIENTS**

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### **D. Glans Penis Perception**

#### **SUMMARY**

Koro is a form of sexual neurosis in which a reaction of acute anxiety accompanies the perception of decreased penis length from intra-abdominal traction. This study attempts to explore the glans penis perception of Koro patients by a graphomotor projective test - DAPT (Draw-a-penis Test). This controlled DAPT investigation shows that Koro patients have significantly less perception of glans penis than the controls do. This perceptual deviation in glans penis image is discussed in relation to the sexual behavioural profile and Koro vulnerability of the patients.

#### **INTRODUCTION**

Freud regarded the penis as the executive organ of sexuality. The word penis has been traced from the Latin word meaning 'tail' or 'to hang', referring its pendent position in the resting state (Sadock, 1975). In both the assumptions the glans occupies a special morphological specificity in penile anatomy. Jackson (1984) highlighted this aspect by stating that the penis is perceived by the male as a tool of male sexual power. The ability of the male to penetrate a female with his penis is crucial for heterosexuality. Glans penis is thus important not only because it occupies the portion of the penis tip but also because it is one of the most sensitive tactile erotic spot for the male and it has a primary functional role in sexual arousal, as the vascular engorgement of it (and of corpus spongiosum) guides the vaginal entry of the erect penis.

Because of its reflexive stimulation in sexual arousal, the glans penis becomes the organ of erotic genital area from the very early years of development. It has also a visual anatomical

specificity in comparison to the penile shaft. This cushion-like expansion of corpus spongiosum at the tip of the penile shaft is separated by a shallow groove. During erection the prepuce is partially retracted by skin tension, thus exposing the tip of the glans and the meatus orifice. By virtue of these anatomic-sensory characteristics, this part of the penis is capable of drawing attention from the very early developmental years of male psychosexuality. For similar reasons, breasts in females and testicles are also highly attended organs. In addition to these, the glans has a different sociocultural cognition which plays an important role in masturbation and sexual activity of an individual. The origin of the term Koro itself has a symbolic meaning in Malay and Bahasa Indonesian dialects, where glans penis is compared to a tortoise head (Wilkinson, 1932). Probably the similarity of indrawing tortoise head under the wrinkled neck with penile hyperinvolution in Koro was the origin of the term Kura or Kuro, and ultimately by corruption, Koro (Edwards, 1984). A similar symbolic naming of the disease (Koro) was noted in Koch-Bihar district of West Bengal (India) by the term 'Kattaow', meaning a small tortoise (Chowdhury, 1991a). It is also interesting to note here that the small lakes (bils) and marshes that are used by the people of this district for growing fish and small tortoises are known locally as Kura (Mazumder, 1977).

Koro is an acute anxiety state in which the perception of reduced penis length due to shrinkage by intra-abdominal traction is the main psychopathology. In previous chapters I focussed on the dysmorphophobic perception of reduced penis morphology of Koro patients. This study is devoted to another special dimension of penis image: the nature of glans penis perception of Koro patients.

## **MATERIALS AND METHODS**

### **Sample :**

Forty single male Koro patients were taken by random sampling without replacement from a sample pool of 77 cases during

during a North Bengal Koro epidemic (Chowdhury et al., 1988). Four control groups, matched for age, marital status and education were taken for comparison. These are normal subjects, patients with hydrocele, with scrotal filaria and with anxiety neurosis, the details of which are discussed in the previous chapter.

#### **Instrument :**

The Draw-a-Penis Test (DAPT) is a projective test devised by the author to elicit the penis perception of the drawer, where he is asked to draw the exact penis of a normal person (of his age) and of himself. In each instance, the drawer was asked to draw two morphologically different penis images: flaccid penis and penis during sexual excitement (extended state). The penis drawing displayed two types of penis tip: one with an identifiable glans, where the drawer has attempted special lines or has attempted the boundary line to mean the glans and the other with no such attempt, which is denoted here as head (Fig.1).

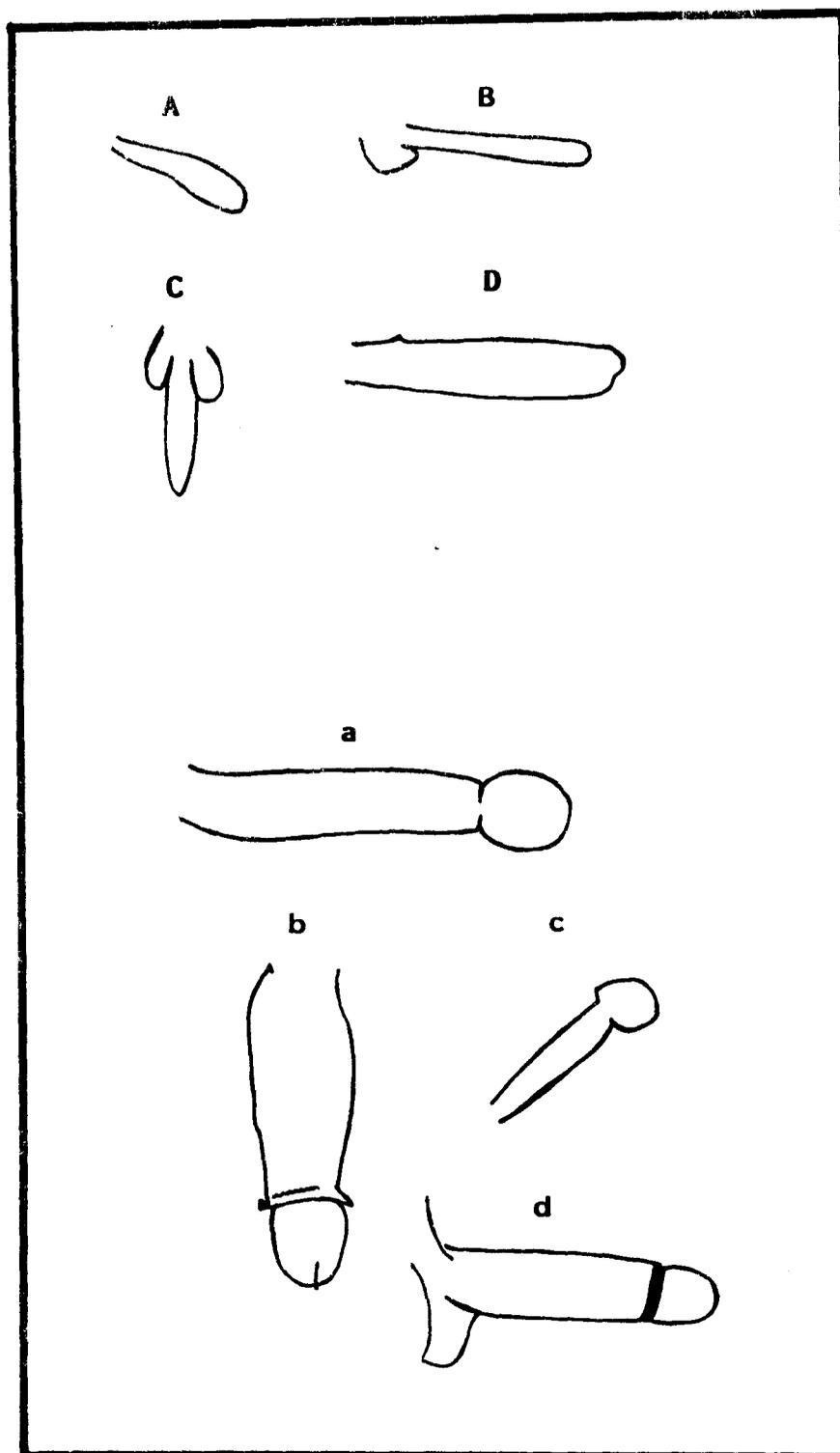
Sexual behavioural history was recorded in a clinical history format during interview.

The time interval between Koro attack and DAPT administration was 8-21 days, mean 14 days.

The Tau test was used for statistical analysis of frequency in identifiable glans drawings of the cases. Student's t test was used for the comparison of sexual behavioral items.

#### **RESULTS**

Table 1 shows the percentage distribution of glans perception (normal penis) in DAPT among the groups where fewer Koro patients identified separate glans than controls did. In both the penile states (flaccid and extended) these differences were statistically significant ( $P < .01$ ).



**Fig.1.** DAPT - Glans Penis Identification (Own-Penis-Flaccid State).

**A,B,C,D** ≡ Penis without Glans - drawing of Koro, Hydrocele, Scrotal filaria and Anxiety neurotic cases.

**a,b,c,d** = Penis with Identifiable Glans - drawing of Scrotal filaria, normal person, Koro and Hydrocele cases.

**Table 1.** Identifiable glans (of normal penis) in DAPT of the groups.

	n	Flaccid		Extended	
			%		%
Koro	40	30		40	
Normal	40	77.5	-4.24**	87.5	-4.36**
Hydrocele	40	67.5	-3.38**	75	-3.15**
Scrotal Filaria	31	70.97	-3.44**	83.87	-3.73**
Anxiety neurotics	40	55	-2.37*	72.5	-2.93**

\*P &lt; .05; \*\*P &lt; .01

In Koro patient's 'own penis' drawing (Table 2), although the percentage of identifiable glans perception was increased compared with that of the controls, the Koro patients identified the glans less frequently in the DAPT in a statistically significant manner.

**Table 2.** Identifiable glans (of own penis) in DAPT of the groups.

	Flaccid		Extended	
		%		%
Koro	35		47.5	
Normal	87.5	-4.82**	92.5	-4.41**
Hydrocele	72.5	-3.38**	80	-3.04**
Scrotal Filaria	67.74	-2.98**	77.42	-2.55*
Anxiety neurotics	60	-2.24*	75	-2.52*

\*P &lt; .05; \*\*P &lt; .01

Table 3 depicts a comparison of sexual behavioural factors (masturbatory age, frequency of masturbation; heterosexual experience and orgasmic satisfaction) between the two Koro groups, i.e. those who displayed glans in the DAPT and those who did not.

Koro patients with non-identifiable glans in DAPT were older at first masturbation than their counterparts ( $P < .05$ ). Other variables showed no significant difference.

**Table 3.** Sexual-behavioural history of the two Koro groups.

	Identifiable Glans in DAPT (n=12)		Non-identifiable Glans in DAPT (n=19)		
	Mean	sd	Mean	sd	t
Masturbatory Age (in years)	10.36	3.08	13.51	2.92	2.77*
Frequency of masturbation per week	4.75	1.95	4.31	2.47	0.50
	No.	%	No.	%	$\chi^2$ (df1)
Heterosexual experience	7	58.3	9	47.37	0.35
Orgasmic satisfaction	7	58.3	6	31.57	2.16

\* $P < .05$

## DISCUSSION

The glans occupies an important anatomo-sensory specificity in the male organ image. This study shows that interestingly a significant number of Koro patients omit the glans in their DAPT drawings. Complete omission of the glans could not be explained by their dismorphic penile perception only (Chowdhury, 1989 a,b). One possible hypothesis is that there may be some disturbances in the sensory component of the glans itself. Masters and Johnson (1970) stressed the importance of the penis in its functional role in providing an organic means for physiologic and psychologic increment and release of sexual tension. Is there any defect in Koro at this physiological level? The importance of early sensory experience in the development of body image and the influence of kines-

thetic, tactile sensations and visual percepts on it has already been documented (Simmel, 1962; Lacy & Birtchnell, 1986). It has also been stated that the external body perception is related to internal body percepts and the development of genital organ awareness (Horowitz, 1970).

The perceptual negation of the glans in DAPT may highlight some possible issues. Is there any physiological (sensory) deficit in the genital axis that fails to activate the cortical representation of the penis image in Koro cases ? Support may be derived from the observation that Koro patients who omit the glans in the DAPT had a significantly higher age for the onset of masturbation. Recent studies (Ewing & Bancroft, 1984) have stressed the role of intracavernosal adrenergic nerves in cavernosal engorgement in diabetic erectile failure (Brindley, 1983). In any case, whatever might be the cause of this deficient organ image, it probably has a positive perceptual influence on the pathology of penile decompensation in Koro. In some other sexual disorders, such as transexualism and fetishism, distortion of body image has been suggested to play such a role (Greenacre, 1953).

## **DYSMORPHOPHOBIC PENILE PERCEPTION - THE ROOT OF KORO VULNERABILITY : A LONGITUDINAL STUDY**

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### **SUMMARY**

Koro is an acute reaction in which the perception of decreased penis length because of hyperinvolution from intra-abdominal traction is the main feature. In the earlier studies it is reported that, despite having an average length penis, Koro patients perceived smaller penis length, in both flaccid and extended states, than did normal subjects. To examine the influence of response bias on the dysmorphic penis length perception, a longitudinal study was undertaken, in which the Draw-a-penis Test (DAPT), a graphomotor projective test, was administered on the same Koro patients three times over two years. The patients showed a remarkable constancy in their perception of penis length. The dysmorphic quality of own-penis perception is discussed in relation to Koro vulnerability.

### **INTRODUCTION**

Response bias is a key problem in clinical psychophysics, especially in processing experiments (Grossberg & Grant, 1978). The response bias tendencies of psychiatric patients are important methodological considerations in the area of perceptual processing experiments (Clark, 1966; Price, 1966; Price & Eriken, 1966). Experimental subjects are expected to or may differ with respect to response bias under different clinical conditions and time in this respect is an important common metric by the influence of which the same person may differ regarding perceptual capabilities at different times (Weckowicz, 1964). Two types of response bias tendency are of crucial importance in psychiatric research: the criterion-level factor, which relates to the willingness of the subject to respond, and the criterion-content factor, which has to do with the content or cues used in the experiment on the basis of which the person has to respond (Kahnman, 1968).

In an earlier report it was found that Koro male single patients perceived 'reduced length' or 'smallness' of their penis size in spite of the fact that they had normal penis size in reality. This perceptual abnormality was elicited by a graphomotor projective test, the DAPT (Draw-a-penis Test), subsequent to their Koro attack. It may be argued that this dysmorphophobic perceptual response is not free from the influences of the response bias, especially of the criterion-level factor, because the patients were administered the DAPT just after their Koro attack when they were supposed to have an increased readiness to express their concern about the symptom-giving body part, and also of the criterion-content factor, because immediately after their Koro attack, the illness itself may cast a damaging impact on their penile perception. So these single DAPT results are probably not clinically sufficient to conclude in favour of their dysmorphophobic penis-image disturbances, unless the perception is tested again over time.

#### **AIMS OF THE STUDY**

With this aim in view the present longitudinal study of penis image perception of Koro male patients was designed, where the DAPT was administered on the same patients at different time intervals. The different DAPT results will enable us to examine whether there is a constancy of the dysmorphophobic penis image perception in Koro patients or whether these perceptual disturbances were the immediate reaction of the Koro phenomenon as such.

#### **MATERIAL AND METHOD**

1. Study Population : Male single Koro patients were collected from the Koro epidemic that took place in North Bengal region, West Bengal state from July to September 1982. By using an operational case selection criteria (age 20 to 40 years; education - minimum of VIII grade schooling; history of single Koro attack; no history of Koro in the family; no history of any illness, operation or accident of sex organs and religion hinduism), a total of 36 rural and 41 urban Koro cases were listed. A set of 20 cases from each pool was taken for this study by random sampling without replacement.

2. Draw-a-Penis Test : Detail description is given in the previous chapter.

3. Time Interval between Koro attack and DAPT administration : The DAPT was administered in almost similar clinical situation at three subsequent time intervals on the same Koro patients during their follow-up visits at the Psychiatry Out Patient department of North Bengal Medical College and Hospitals, Siliguri. The first DAPT was administered within three weeks of the Koro attack, the second at and around six months and the third after two years of the attack. The patients who failed to appear in the second DAPT were not included in the third DAPT. The following table will illustrate the different time intervals between Koro attack and DAPT administration.

	N	RURAL		URBAN		TOTAL	
		$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
FIRST DAPT							
In days		14.7	5.9	13.7	6.0	14.2	5.9
SECOND DAPT	N	14		18		32	
In months		6.1	1.6	7.2	2.6	6.7	2.3
THIRD DAPT	N	10		15		25	
In years		2.2	0.7	2.2	0.5	2.2	0.6

4. Statistical treatment of the data : The DAPT results were analysed by using two types of test statistics, viz., paired t test and correlation coefficient analysis.

## RESULTS

DAPT results of 'Own Penis' drawings are only analysed and reported.

### I. Consecutive Measurement of First, Second and Third DAPTs :

The distribution of own penis flaccid state length measurements at three consecutive DAPTs clearly showed (Table 1) that in each group values are similar to each.

**Table 1.** Distribution of own penis flaccid state length measurements (in cm) of three consecutive DAPTs.

		<u>RURAL</u>	<u>URBAN</u>	<u>TOTAL</u>
FIRST DAPT	N	20	20	40
	$\bar{X}$	3.9	3.99	3.94
	sd	1.17	1.23	1.20
SECOND DAPT	N	14	18	32
	$\bar{X}$	3.85	4.21	4.05
	sd	1.09	0.90	1.0
THIRD DAPT	N	10	15	25
	$\bar{X}$	4.06	4.19	4.14
	sd	1.29	1.31	1.27

The distribution of own penis extended state length measurements of three consecutive DAPTs also similarly evinced the same picture (Table 2). The values for the total group in both the penile state measurements also showed the same results.

**Table 2.** Distribution of own penis extended state length measurements of three consecutive DAPTs.

		<u>RURAL</u>	<u>URBAN</u>	<u>TOTAL</u>
FIRST DAPT	N	20	20	40
	$\bar{X}$	4.04	4.24	4.14
	sd	1.14	1.19	1.16
SECOND DAPT	N	14	18	32
	$\bar{X}$	3.93	4.37	4.18
	sd	0.82	0.78	0.83
THIRD DAPT	N	10	15	25
	$\bar{X}$	4.16	4.52	4.38
	sd	0.80	0.62	0.68

## II. Second DAPT Measurement and their corresponding First DAPT values :

The distribution of own penis flaccid state length measurement of the second DAPT and the corresponding values of the cases in their first DAPT showed (Table 3) that the values in both the samples (rural and urban) of the second DAPT are almost similar to their respective first DAPT values. A comparison of the differences in measure between the second and first DAPT also shows that there are no significant differences.

**Table 3.** Distribution and comparison of own penis flaccid state length measurements of the second DAPT and the respective values of the cases in the first DAPT.

N	<u>RURAL</u>		<u>URBAN</u>		<u>TOTAL</u>	
	14		18		32	
	$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
SECOND DAPT	3.85	1.09	4.21	0.90	4.05	1.0
FIRST DAPT	3.90	1.19	4.08	1.23	4	1.62
t(df)	-0.30 (13)		-1.05 (17)		-0.51 (31)	

The distribution of own penis extended state length measurement of the second DAPT and the corresponding values of the cases in their first DAPT shows (Table 4) that the values in both rural and urban samples are not only very close, but strikingly the urban value is exactly the same in both DAPT measurements. A comparison of the differences in measure between the second and first DAPT is insignificant.

**Table 4.** Distribution and comparison of own penis extended state length measurements of the second DAPT and the respective values of the cases in the first DAPT.

	N	RURAL		URBAN		TOTAL	
		14		18		32	
		$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
SECOND DAPT		3.93	0.82	4.37	0.78	4.18	0.83
FIRST DAPT		4.01	1.16	4.37	1.21	4.22	1.16
t(df)		-0.49 (13)		0(17)		-0.33(31)	

### III. Third DAPT Measurements and their Corresponding Second and First DAPT Values :

The distribution of own penis flaccid state perception as evinced in the third DAPT measurement and the corresponding values of the cases in their second and first DAPTs showed (Table 5) that though in the third DAPT there is a slight fractional increase in measure noticed in both rural and urban Koro groups compared to their first and second DAPT measurements, a comparison of the differences in measure between the third and first DAPT is insignificant.

**Table 5.** Distribution and comparison of own penis flaccid state length measurements of the third DAPT and the respective values of the cases in the second and first DAPT.

	N	RURAL		URBAN		TOTAL	
		10		15		25	
		$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
THIRD DAPT		4.2	0.84	4.32	0.68	4.27	0.76
SECOND DAPT		4.17	1.10	4.31	0.92	4.25	0.99
t(df)		0.22(9)		0.10(14)		0.28(24)	
FIRST DAPT		4.06	1.29	4.19	1.31	4.14	1.27
t(df)		0.70(9)		0.63(14)		0.93(24)	

The correlation between perceptual measures of the third and second DAPTs shows (Table 6) that the values in both the groups are very well correlated (rural:  $r = 0.94$  and urban :  $r=0.92$ ). Although the correlation between the third and first DAPT measures shows good correlation, the rural values are better correlated ( $r=0.93$ ) than the urban values ( $r=0.75$ ).

**Table 6.** Correlation coefficient of own penis flaccid state length perceptions among the three DAPT measurements.

<u>DAPT</u>		<u>RURAL</u>	<u>URBAN</u>	<u>TOTAL</u>
THIRD/SECOND	r :	0.94	0.95	0.92
THIRD/FIRST	r :	0.93	0.75	0.89

The distribution of the own penis extended state perception as evinced in the third DAPT measurement and the corresponding values of the cases in the second and first DAPTs show (Table 7) that, though in the third DAPT there is a slight fractional decrease in measure in both rural and urban groups from their first and second (except rural group) DAPT measurements, the comparison of the difference between the third and the second DAPT shows absolutely no difference ( $t = 0$ ) and that between the third and the first DAPTs is also statistically insignificant.

**Table 7.** Distribution and comparison of own penis extended state length measurements of the third DAPT and the respective values of the cases in the second and the first DAPTs.

	<u>RURAL</u>		<u>URBAN</u>		<u>TOTAL</u>	
N :	10		15		25	
	$\bar{X}$	sd	$\bar{X}$	sd	$\bar{X}$	sd
THIRD DAPT :	4.16	0.80	4.52	0.62	4.38	0.68
SECOND DAPT :	4.11	0.90	4.57	0.83	4.38	0.90
t(df) :	0.59(9)		-0.59(14)		0(24)	
FIRST DAPT :	4.27	1.19	4.58	1.21	4.46	1.17
t(df)	-0.14(19)		-0.32(14)		-0.55(24)	

Correlation analysis shows (Table 8) that the values are better correlation between the third and the second DAPT ( $r=0.93$ ) than between the third and the first DAPT ( $r=0.73$ ). In the correlation between the third and the second DAPT values, the rural group showed better correlation ( $r=0.96$ ) than the urban group ( $r=0.87$ ), while the correlation between the third and the first DAPTs of both the groups showed almost similar results in correlation values (rural:  $r=0.77$  and urban :  $r=0.73$ ).

**Table 8.** Correlation coefficient of own penis extended state length perception among three DAPT measurements.

<u>DAPT</u>		<u>RURAL</u>	<u>URBAN</u>	<u>TOTAL</u>
THIRD/SECOND	r :	0.96	0.87	0.93
THIRD/FIRST	r :	0.77	0.72	0.73

## DISCUSSION

The most important well evidenced finding in this longitudinal study of penis-image perception of Koro patients is the consistency in their dysmorphophobic self penis perception. At three different time intervals, well apart from the Koro attack, they displayed the remarkably same patho-perceptual dimension of their penile-length morphology, both of flaccid and extended states. In an earlier study it was found that the measure of penile length perception of the first DAPT here was significantly less than that of a normal person (section-I of this chapter). The present finding is thus strongly suggestive of their disturbed penis-image perceptual disposition, which should not merely be interrupted in the light of their Koro after-effects.

In an earlier report (section I, of this chapter) it was found that Koro patients perceived a reduced penis length (of own penis) in spite of the fact that they have normal penis length in reality and it is in this respect that they resemble the dysmorphophobics. This finding of disturbed penis-image perception (reduced length or smallness of penis size) of Koro cases as evinced in the first DAPT has remained unaltered in the subsequent testings which proves that

this perceptual disturbance is not only free from response biases, but also a perceptual constancy is maintained throughout this time period, when the effects of response bias can be easily ignored (Fig.1).

This distortion in body (organ) - image perception of Koro may fall into the category of Kinesthetic hallucination, the content of which is suggestive of dynamic significance, so far as psychosexual life and sex-guilt cognition of the cases is concerned. This hallucinated body image, which the patient accepts as reality, may represent the projection onto the outer world of the inner conflicts concerning psychosexuality, because the psychological material has the tendency to be projected in the image symbols of any of the senses, which is of course best suited to symbolize the particular psychic content seeking expression. It has been reported that a Koro patient maintained the penile perceptual disturbance over a period of 20 years (Berrios & Morley, 1984). Yap (1965a) relates beliefs in penile shrinking with "an underlying perceptual distortion of proprioceptive perception, a distortion of a part of the body image". He also asserted, by using the theory of 'partial depersonalization' (Schilder, 1935), that the genital portion is "more liable to catathymic distortion".

The clinical profile of acute anxiety with penile retraction in Koro attack in this context may be explained by the 'perceptual release' theory (West, 1975). This theory states that our conscious awareness is maintained by the constant scanning and screening of incoming information from external and internal worlds by the brain. When sensory input is diminished or impaired by excessive affect, the stimulating effect of the sensory input decreases with the increase of cortical arousal. In such a situation, 'perceptual traces' otherwise dormant by the healthy screening action, are released and re-experienced in consciousness in the form of hallucinatory episodes. For such release to be effective the level of conscious awareness should be sufficient and then only the particular perception-bearing circuit will reverberate with that awareness (Fig.2). In the Koro patients, this disturbed penis perception, which otherwise remained dormant, gets expressed as an acute Kinesthetic hallucinatory experience in their Koro attack. This reaction, as suggested by Yap (1965a), is the dissociation from ego of all the Kinesthetic and tactile sensory components of perception related to sexuality. This theory is indicative of the

Consecutive DAPTs (Penis length : PL) of Two Rural Koro Patients.

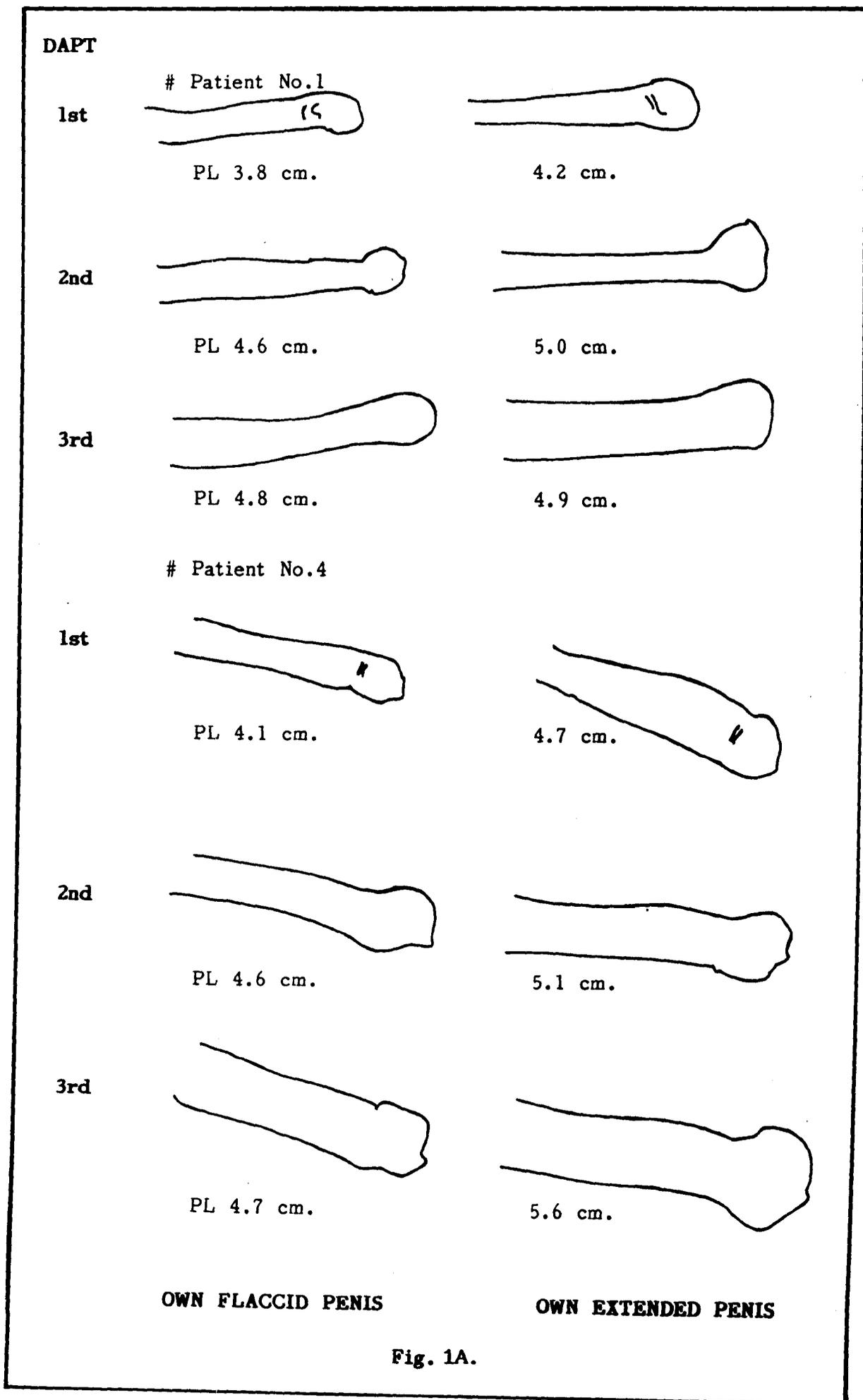
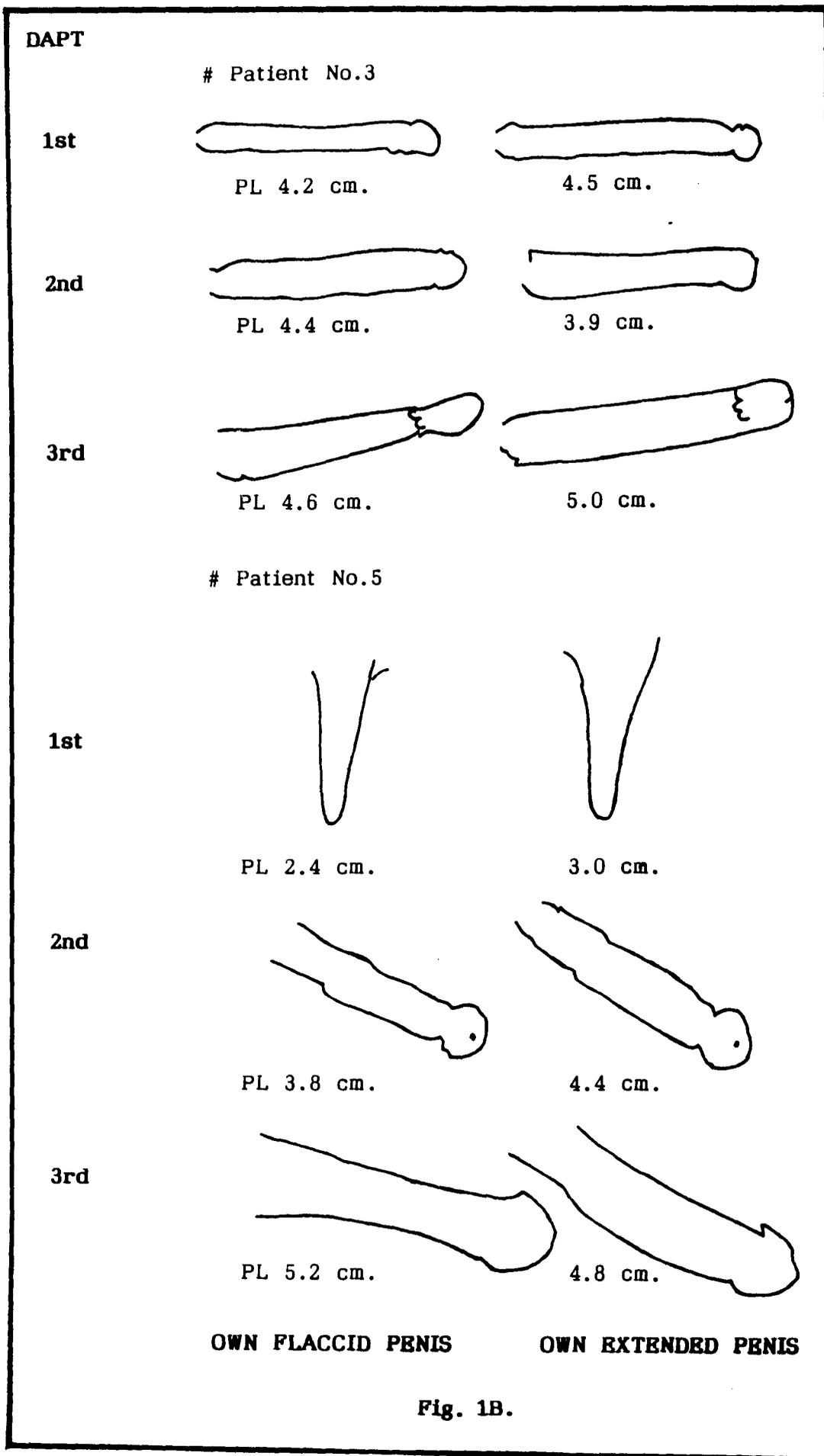
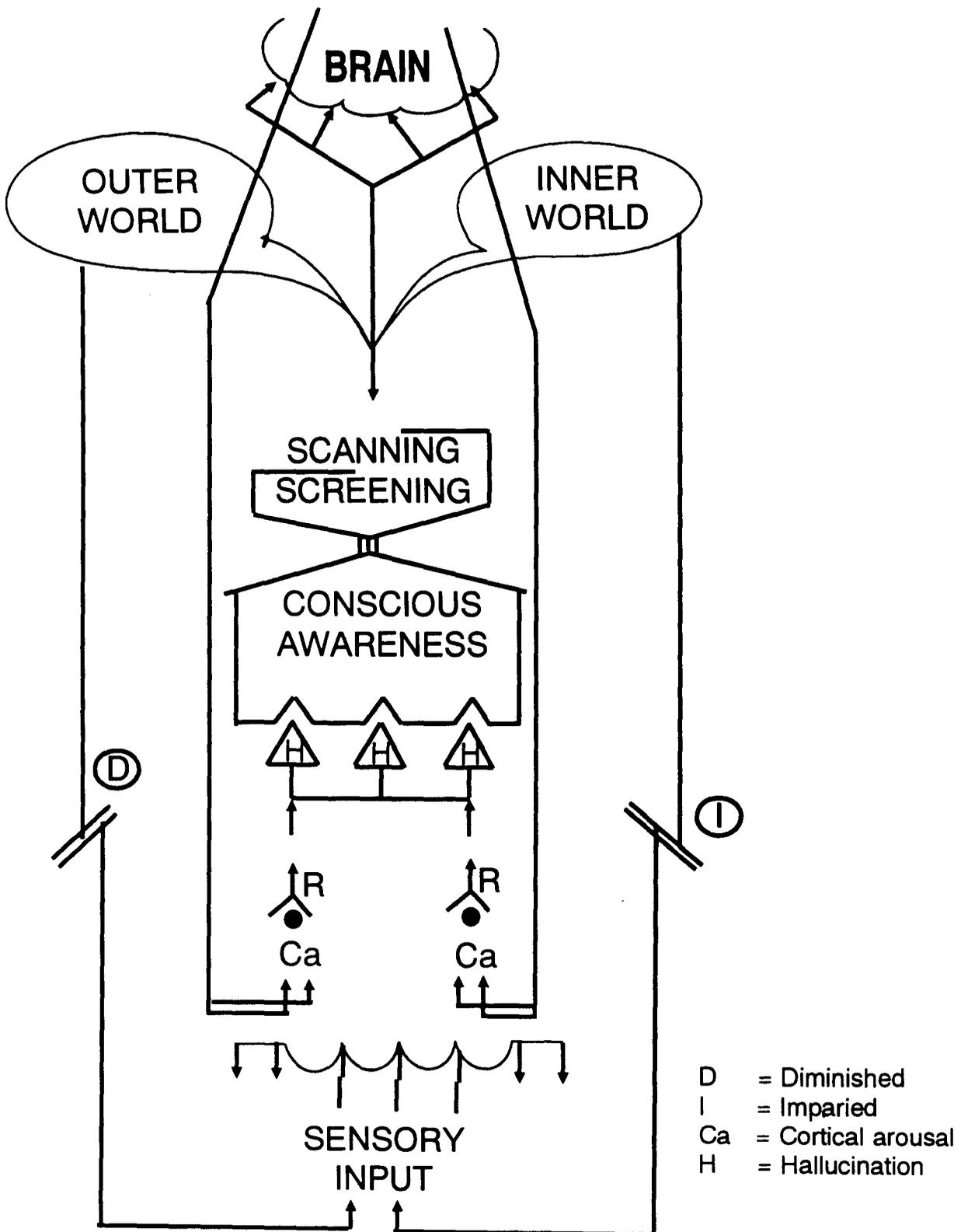


Fig. 1A.

Consecutive DAPTs (Penis length : PL) of two Urban Koro Patients.





- PERCEPTUAL TRACES >RELEASED (R)  
REEXPERIENCED AS HALLUCINATION

Fig.2 : 'Perceptual release' in Koro.

patients' dormant sexual conflicts being projected in the area of Kinesthetic genital perception, leading to dysmorphophobic conviction of penile shortening being triggered by the cultural-emotional sexual beliefs during their acute attack. Perceptual constancy of this dysmorphophobic body image is also suggestive of the fact of their fixed concern about the symptom arousing body part, which in turn also points to their deep rooted conflicts concerning the area of masculinity-sexuality. Thus the pathoplastic covert emotional psychodynamics influences the body image perception and gets expressed in pathogenic proprioceptive perception (of organ image). In this regard urban and rural Koro patients showed no dissimilarity.

### CONCLUSION

Koro patients have dysmorphophobic penile perception not only during their Koro attack but also in the post-Koro period (at least up to two years). This post-Koro perception is however not symptom producing.

This pathogenic penile perception is not the 'after-effect' of Koro but maintains perceptual constancy.

Rural and urban Koro patients showed the same constancy in their penis-image perceptual error.

## PERCEPTUAL DEVIATIONS IN PENIS IMAGE

A perceptual deviation in penis image is the hallmark of the Koro phenomena. Many patients having sexual dysfunction also reported a defective penile perception regarding either its morphology or its functional capability. The present discussion is mainly on the issue of defective penis image viz. the apprehension of a 'small' penis which the patient may impute either to intra-abdominal traction (as in Koro) or to reasons other than abdominal pull (as in some cases of impotent patients). In what follows the subject matter is grouped under four headings.

### 1. **Penis Visibility and Visual Axis**

The penis in adolescent or adult males is a draped private organ which is neither visually exhibited like other body parts nor is there any licence of it being viewed by others. External body parts like the face, arm, hand, finger or leg can be scanned most of the time both by the owner himself and by others (rest of the population) thereby developing a stable organ cognition on the basis of reciprocal feedback, scrutiny, criticism and suggestion regarding the organ concerned. This is a very important process that helps an individual to develop a consensus opinion about his body parts which in turn helps him to frame a cognitive map of and attitude towards his exposed parts. If he should have any inferiority feelings, query, dissatisfaction or anxiety regarding a certain body part, these reciprocal interactions will normally tend to neutralize such conflicts. Clearly, however the picture vis-a-vis the penis organ is altogether different. Firstly, there is customarily no room for such a discussion by other viewers concerning somebody's penis owing to obvious reasons of privacy and secondly, unlike other body parts an individual can not compare his own penis organ with that of others. This therefore excludes the possibility of the penis being the subject of open reciprocal and comparative discourse. Hence the penile cognition remains an absolutely private cognition of an individual.

Teenagers may talk about their penis(es) with peers and friends, most of whom have a penis perception full of fantasy with unhealthy overtone. Such ideas and beliefs are in no way helpful for the development of a healthy penis image. Most of the time these discussions take place under the veil of shyness and anxiety in the atmosphere and always involve an unreal construct of masculine strength, prowess and myth of sexual morality. So, for these social reasons, anatomical situation and moral aesthetics, the penis remains under the domain of very private scrutiny rather than be an issue of open social discussion.

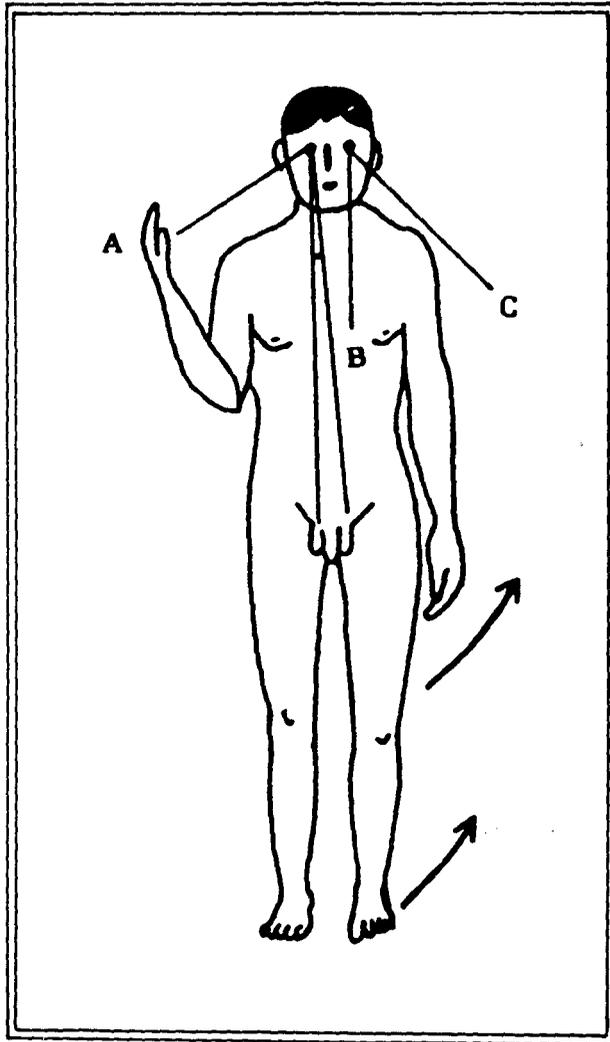
Those who have had the chance of premarital heterosexual relation may also have the probability of having a discussion or an opinion about their penis(es) from their partner(s). But this opinion if negative, may make the recipient highly vulnerable and may cast a devastating influence on the masculine image of the individual. Since in most cases each such premarital heterosexual situation is either experimental namely to test 'potency' or pleasure seeking, the carnal performance as such is crucial there and not the observation of the penile anatomy. The negative criticism about the penile anatomy by the partner may generate a defective penis image accompanied by a tormenting anxiety which also may drag the subject towards sexual dysfunction. Similar situation may evolve from a marital relationship as well.

It is therefore, seen that in a prudish society hardly any opportunity exists wherein a healthy discussion on the penis, and sexuality in the wide sense, could be undertaken by an interested individual. As a result an individual is primarily dependent on two things - his own visual examination (of penis) followed by the corroboration of his own ideas and beliefs. As I remarked earlier, most of these ideas and beliefs are culturally framed having no scientific basis and are associated with many false and magical sexual myths.

Private penile scrutiny is of two types : one, visual and two, anatomo-sensory-tactile perception. The visual perception of one's penis is different than that of other body parts. The visual

field for other body parts is more wide and frontal or it can be shifted for better visualisation towards a preferential position aligned with the visual axis. This visibility factor is crucial for the development of body image. If a body part is not clearly seen, it is a source of fear and anxiety, a common example is the face and back of our body. An intense concern about the face as often seen in adolescence or in dysmorphic subjects (regarding the nose or ear configuration) and their frequent mirror-looking behavior is an example of the repeated visual checking-rechecking aspect of body image. The underlying anxiety is the driving force for seeking cosmetic surgery or the unusual use of cosmetic soaps or lotions. The 'unseen' character of the back is a source of fear, anxiety and threat of a different dimension. So a satisfactory visual clarity is crucial for the process of organ image perception. There is a wide option of viewing other body parts like arm, finger, leg and front of the trunk. External movable body parts can be seen through full solid angle by shifting the part appropriately aligned with the visual axis by maximizing the vector projection of the optical image of the organ. In contrast, for viewing the penis the picture is entirely different because : (1) the anatomical location of the organ itself only permits an oblique view in acute solid angle; (2) fixity of the organ does prevents its shifting from the normal anatomical position towards the visual axis and (3) the view from the top in a vertical line of the penis and serotum allows a very narrow vector projection of the optical image (Fig.1). These anatomo-optical specificity for penis viewing hinder the perception of the penis organ in its dimensional totality. So, normally there remains a perceptual gap or deficit so far as the details of the size, shape, volume, and general appearance of the penis are concerned. This narrow visual perception does not warrant a complete cognition of penis image in contrast to that for other body parts.

An individual may have variation in penile morphology due to sexual arousal (other than situation of frank intercourse) and in those cases usually this change of penis size and shape is merely experienced by anatomo-sensory-tactile perception rather than viewing.



**Fig.1.** Penis visibility in acute solid angle. A,B,C - different frontal variable positions of visual axis in which other body parts could be easily aligned.

So erection mostly remains a matter of sensory-tactile perception in contrast to the usual visual perception of other body parts.

The penis image perception that individuals usually have is something like a 'go with what you have' type perception or a generalised 'working' penile perception. So long the functional aspect of penis goes all right, other limitations in penis image neither surface nor cause any morbid concern about its anatomy. Those, who are keen about their penis organ because of some reason (eg. impotency, sexual conflicts and guilt or supposed sexual organ dysfunction in sexual neurosis) may show undue penis-awareness and engage themselves in visual scrutiny is very crucial for such persons because at this point they usually attribute their sexual dysfunction and anxiety to self-alleged anatomo-physiological penis conditions. These conditions ultimately earn a 'disease' character at par with the subject's sexual beliefs and misconceptions. Thus an impotent patient suddenly discovers that his penis is slightly left-titled or the urine flow is not with 'enough' expulsive force or the length of the penis has decreased etc. Even the cremasteric contractions are viewed with great pathological significance or the 'changed palpability' of testicles (hard or soft) carries a definite illness message. These are a few examples where psychosexual anxiety transmits to organ anxiety and makes a firm ground for sexual morbidity.

This pathological penis-awareness along with private organ scrutiny is a very important primary step towards the penile symptom-choice in sexual dysfunctions. The situation, the reason and the feeling state at the background of this private organ search is decisive because the tendency of attribution of sexual misbeliefs to the organ is positively correlated. A similar example may be drawn from the psychopathology of delusional idea where a trivial phenomenon suddenly gains delusional conviction and is interpreted in a new light, "as if the scales had fallen from my eyes" (Slatter & Roth, 1977). Analogously here also different penis 'abnormalities' are discovered by the individual and eventually pathological sexual anxiety will be displaced onto the organ, an organ which in itself is vital for the image of masculinity.

## 2. Penile Anatomy-Physiological Specificity

A perception of penile shortening or small penis is a commonly reported clinical finding. The penis has two distinct morphological states : one, the trait penis condition, i.e., the penis during its usual flaccid state and two, the state penis condition, i.e., the penis during sexual arousal in an extended state. The size and shape of flaccid penis is not constant or static, because many different situations like exposure to cold, fever and physical exhaustion may cause shortening of penis length. The extent of this shortening has no universal standard. Physical conditions like excessive pad of fat in lower abdomen or over the pubis region or abdominal swelling as in ascites, may cause apparent penile shortening. A similar finding is also common in scrotal swelling of orchitis or scrotal filaria (Chowdhury, 1989). Postmasturbation or post-coital penis size is also small because of the obvious reasons of vascular physiology and refractory period (Heiman, 1977).

There is no standard measurement of this reduction in penis length. The labelling of this shortening as 'pathognomonic' is entirely dependent on the penile length cognition of the individual, i.e., his personal estimate and bias about penis length, in relation to normal and abnormal, influences this observation. As a case in point, an impotent patient suddenly discovers after bath that his penis is too small and he attributes his erectile inability to this 'organ defect' and consults more than a dozen doctors over a period of two years without any result !

So the smallness or shortening of flaccid penis is not a clinical phenomenon but it becomes a phenomenon of great significance only when an individual designates his morbid cognition on it. In Koro this cognition is the belief of a malevolent intra-abdominal pull operative at the penis root (Chowdhury, 1991). So the perception of alteration of penis size and shape is entirely a cognitive process.

Why is the 'smallness' or 'shortening' of penis is a common complaint in cases of penis image disturbances ? What is the cognitive clue for this pathoperceptual phenomenon ? This concept has

a normal cognitive background specific to the penis organ itself. The concept of 'smallness' or 'shortening' has a standard organ image referential perspective. The size increase of other body parts never contribute a cognition of smallness. Penis is however a dynamic organ having two states : erect and flaccid, i.e., it has a bidirectional morphological character. So the construct of 'smallness' or 'shortening' is a visuo-sensory reality inherently associated with the penis anatomy and physiology. Scrotum also have this apparent bidirectional volumetric disposition, albeit to a lesser extent. There is no other overt part in the body which has this unique character. So the probability of 'smallness' or 'shortening' is a natural cognitive component of penis image perception, which transfers over to the perception of morbidity only in vulnerable cases.

### 3. **Effect of Cultural Sexual Cognition**

We will now discuss how the basic process of symptom choice centres around the penis perception. There are reports of Koro cases from USA and UK involving immigrant patients (Constable, 1979; Ang & Weller, 1984; Edwards, 1970; Hess & Nassi, 1977). In these situations, because of the wide difference in cultural construct of sexuality, a question of cognitive-conflict comes into play. The cultural influence on sexual cognition and behavior becomes more preductive in the face of a permissive social environment where sex is more liberal and free mixing is not at all frowned upon. This is usually very important for those who are coming in contact with the Western culture and are of Oriental origin, where sex is generally tabooed and has a serious moral overtone. The sexual orientation, heterosexual behavioral custom and sexual opportunities and exposure in the technologically advanced countries are entirely different. This difference may generate sexual conflict in the sexual behavior of an individual, given the context of his own cultural frame of reference. Similar Western (modern) - - Oriental (traditional) differential interactions has been reported from other health related areas also (Sarell & Baider, 1984; Wise & Rosenthal, 1982). As a case in point, a married Indian male had an enjoyable sexual contact with a woman ("call girl") during his visit to France. On his return to India, he suffered

a failed intercourse at his first attempt with his wife. The subsequent attempts were also unsuccessful. He explained his failures as "I feel myself deeply guilty because I enjoyed a woman other than my wife, which is really an unpardonable sin". A liberal sexual atmosphere like even the free access to blue films or pornographic material may evoke sex guilt in predisposed individuals (Gerrard & Gibbons, 1982).

Sex guilt has two components : (a) Subjective - psychological i.e. conflicts, anxiety, depression and self-reapproach, and (b) Objective-organic i.e. concern with the sexual body part, viz. penis. Extreme organ awareness thus generated prompts the individual to check and recheck the sexual organ anatomy and physiology. This heightened responsiveness at the background of private scrutiny of sex organ paves the way to develop dysmorphic perception, accompanied by functional morbidity according to his sexual-cultural cognitive status. A very common example in this area is the venerophobia (Oates & Gomez, 1984). So, in every cases with subjective penile pathology, the detailed psychosexual history, the evaluation of the sexual-behavioral profile and the sexual cultural beliefs of the cases may help to identify the genesis of the very morbid penile perception.

#### 4. Management

The management of such cases involves the careful elicitation and exploration of the history with special stress on the onset point. Questions like how he discovered the defect, what difficulty prompted him to visual penile scrutiny etc. have to be asked. If this definite area can be pin-pointed, cognitive psychotherapy, quite educative in nature, should be instituted, so that his false perception of penis image is corrected. These patients always have significant anxiety. Hence, anxiolytic medication (oxazepam/lorazepam) will be very much helpful. Depression, reactive in nature, is a very common accompaniment. Antidepressants (doxepin hydrochloride) in moderate dosages will also be helpful. Many patients often craves for vitamin 'tonics' or tablets as they have the idea that these medications will help them to revive their 'masculine energy'. Judicious prescription of

B-Vitamins with appropriate psychotherapy may enhance the treatment compliance. Some patients may express particular faith for specific food items in order to regain 'masculine strength', eg. meat, egg etc. These dietary articles may well be included in the diet prescription. After a reasonable reduction of anxiety/depression and desired cognitive change, the patient should feel comfortable about his organ image. The treatment success lies in the skillful exploration and utilization of cognitive clues, anxiety reduction and an empathic doctor-patient relationship.