CHAPTER V
DISCUSSION

The major consequences of head injury are the various psycho-social disturbances that arise sooner or later. These maladjustments largely determine the outcome after the injury. To understand the psycho-social sequelae of head injury, 110 patients were studied three years after the occurrence of head injury.

The sample under study comprised predominantly of young people. People in younger age groups are more active in the social and vocational spheres and so face an increased risk of injury to the head. This has been the observation of most studies in head injury (Natarajan et al., 1987, Sabhesan and Athiappan, 1989). The male preponderance among the patients (with a male-female ratio of 5:1) is attributable to the greater vulnerability of the male to encounter traffic or industrial accidents, clashes, etc. Women are mostly occupied in domestic activities and are seldom exposed to accidents.

There was a higher representation of rural patients than the urban in the study and a great majority were married.
A majority of the patients had had little or no education. The sample mainly consisted of patients who belonged to the lower stratum of society.

The psycho-social sequelae include the problems of the head injured and their families. The outcome was measured in terms of the behaviour sequelae and dysfunction at the individual level. The burden experienced by the families, and the interactional changes in the families reflected the disturbances at the family level.

Behaviour disturbances after head injury are common which affect both the individual and their families. These disturbances were measured by using a check-list (Sabhesan 1989).

Dysfunction is an index of the psycho-social outcome after head injury. It is defined as a psycho-social concept which takes into consideration the present level of functioning in comparison with the premorbid level (Pershad et al., 1983).

Psycho-social dysfunction is sub-classified into social adjustment, vocational adjustment, personal adjustment, family adjustment and cognitive adjustment. Each of these areas is precisely measurable by the
Dysfunction Analysis Questionnaire (DAQ). Social adjustment comprises of participation in social activities, recreation and interacting with friends and relatives. Vocational adjustment refers to co-operation with co-workers and superiors, working capacity and the ability to maintain the income level. Personal adjustment means one's own adjustments like taking food, sleeping and maintaining personal hygiene, temperament and habits. Family adjustment is characterised by involvement in the family's affairs and the harmony that the patient maintains. Cognitive adjustment denotes the sum total of the expression of mental faculties such as concentration, memory, decision making, reality orientation, recognition, comprehension, mental stability and interests.

Family burden denotes the impact of the individual's disabilities on the family. The affected family experiences burden in various areas namely finance, routine family activities, family leisure, family interaction, and physical and mental health of the family members.

Family interaction reflects the qualitative aspect of family functioning. Disturbances after head injury reflect the extent to which the various
subfunctions are susceptible to changes in the functioning of the injured individual. In order to measure this, the interaction occurring in the family at various subsystem levels were considered.

There seems to be a relationship between stressful life events and head injury as a cause and as a consequence and as a source of aggravation of the sequelae. In order to find out whether the stressful life events have any association with the extent of sequelae of head injury those events were studied by using Presumptive Stressful Life Events Scale (Singh et al.1983).

Each of these areas is correlated to a varying extent to socio-demographic factors, certain neurological factors and psychiatric disturbances.

The role played in the dysfunction of the injured individuals and the burden and interaction of their families by socio-demographic factors like age, gender, domicile, education, family jointness, occupation, marital status and income was studied. It is found that age, sex, domicile and education did not affect the various areas of adjustment (Tables 8, 11, 14, 17). It is generally assumed that dysfunction increases with age. According to Smith (1974) age is an important variable in
determining the prospect of recovery. Symonds (1962) opined that young persons improve well as the margin of reserve neurons is greater in them and with increasing age this margin is gradually depleted. However it was not found to be so in the present study. Violon and Mol (1987) disputed the role of age in cognitive adjustment which is the primary aspect of dysfunctions.

The absence of any significant influence of the gender on the dysfunction is attributable to the fact that male and female patients are equally vulnerable to psycho-social maladjustment and gender does not influence the outcome. Ramasamy et al. (1987a) studied 50 patients with open head injuries 18 months after the injury and found that males and females suffered from similar levels of dysfunction.

There was no appreciable difference in dysfunction levels between rural and urban patients (Table 14). This is probably because the urban areas included in the study are small towns and the people residing there have attitudes and behaviour towards head injury very similar to those of the rural patients.

The educated patients do not differ from the illiterates in their knowledge of and attitude to
head injury and hence the lack of difference between them. Ramasamy et al. (1987a) showed a similar finding.

It is also found that age, sex and domicile did not influence the burden and interaction of the families (Tables 9, 10, 12, 13, 15, 16). Though family burden (Table 18) and many of the components of family interaction (Table 19) are not influenced by the level of education of the patients, the families of patients with a higher level of education differ from the families of patients with a lesser level of education, in the areas of family investment of selves in home, freedom interaction (uninjured parent), parents' acts toward the children (uninjured parent) and child-parent interaction. Among these educated patients, 7 were married and making more than Rs.2000/- per month and had considerable occupational status. The improved standard of living and the better economic status of these families account for the proper family investment of selves in home. The children of the educated patients enjoy more freedom than those of patients with lesser education as the communication between those of the former group is well maintained and their interaction is more refined.
While dysfunction in the social, personal, family and cognitive spheres did not vary with the occupation, professionals had lesser vocational dysfunction (Table 20). The professionals in this study were those who had secured jobs and decent salaries and their colleagues were better educated and more supportive than the colleagues of patients from the other categories. Sabhesan et al. (1990c) found that among the professionals the work was frequently shared by others. This explains their better vocational adjustment. Unskilled workers were mostly agricultural and other labourers who had to work for daily wages. There is no job security for them. Their work is physically more demanding. Among the skilled workers, sensitivity to noise, loss of vocational skills etc. were some of the causes for their poor vocational adjustment.

Burden experienced by the families of professionals was less in the areas of finance, routine family activities, physical health and mental health of the family members and total burden compared to other occupational groups (Table 21). It is clear that the families of the professionals enjoy better interaction than the families of unskilled and skilled workers (Table 22).
The marital status of the patients did not have any impact on the dysfunction of the patients (Table 23). In the case of the married patients the burden is entirely shouldered by the spouse (Oddy et al. 1978) and as a result the spouse is subjected to more strain with multiple responsibilities. Conflicts due to change in family leadership, dependence of the patients on their spouses, marital conflicts due to delusions of infidelity, irritability and violence account for the strained interaction and poor prognosis of outcome thereon. Ramasamy and Ramanaiah (1987) noted that the spouses understand their injured husbands as strangers and develop an attitude that leads to snapping of the marital bond. In the case of single patients, their parents may readily accept the dependent role of the patients as it reflects the earlier phase of their relationship (Oddy et al. 1978). But in the present study married and unmarried patients do not differ in dysfunction. Burden (Table 24) and interaction (Table 25) in their families do not differ either.

The various areas of dysfunction are found to be influenced by the income of the patient. An inverse relationship between dysfunction and income is evident.
Families with higher income are able to extend better support to the patients for a longer time. The needs of the patients including medical treatment are readily met when the families are economically affluent.

The burden of the families is also influenced by the family income. The lesser the family income the greater the family burden (Table 27). A similar trend is observed also in most of the areas of the interaction among the families (Table 28).

The role of family jointness in the psychosocial outcome was also studied. Dysfunction was not found to be associated with family jointness (Table 29). The outcome was determined rather by the quality of functioning among the members rather than by jointness. Family burden and family interaction were also similar among the families with different levels of jointness (Table 30, 31).

The clinical factors associated with head injury that have been taken into account for determining the psycho-social outcome include biomechanics of head injury, duration of coma, length of post-traumatic amnesia, skull fracture, brainstem signs, presence of early neurological deficits, early and late seizures and
neuro-physical deficits and alcohol dependence.

The nature and the severity of the brain damage depends on the mechanical force that the head has suffered. The word 'biomechanics' is used to describe the mode of energy loading during the impact. The biomechanics of head injury determines the pathological changes in the brain. Head injuries due to traffic accidents and falls are considered acceleration injuries while injuries due to assault are due to direct contact loading. The injury is more diffuse in the former (Ommaya 1982) and the injury is mostly focal to the brain in the latter (Sabhesan et al. 1990c).

Bullock and Teasdale (1990) postulate that when the head receives acceleration or deceleration forces, the brain, which is poorly anchored within the skull and is soft in consistency, moves within the skull.

Acceleration injuries lead to swirling movements in the brain resulting in rotational and linear stresses and they damage the nerve fibres (Lishman 1989).

However, no significant difference in the outcome was found in this study between patients with acceleration injuries and patients with contact injuries.
It appears that biomechanics affects the immediate outcome and that recovery occurs over a period of time. Likewise the burden (Table 33) and interaction (Table 34) of the families of both the groups were similar because there was no difference in dysfunction in patients belonging to either group.

Head injury very often results in loss of consciousness. Coma due to head injury is a valuable neurological index of the severity of the injury. According to Achte et al. (1969) the duration of coma after injury reflects the seriousness of the underlying brain damage. In the present study 66 patients suffered coma of varying duration (Mean 5.67 hours). When the duration of coma was correlated with the degree of dysfunction it was found that there was no significant correlation between them (Table 35). This finding is in conformity with the previous observations in India (Natarajan et al. 1987) as well as in the west (Violon and Mol 1987). Coma was not found to influence the family burden (Table 36) and family interaction (Table 37).

In most cases, coma does not end abruptly and it is followed by amnesia. The length of PTA which is a measure of the overall severity of brain damage in closed head injuries is said to be due to a diffuse rather than
focal disturbance of cerebral function (Lishman 1989).

Post-traumatic amnesia (PTA) is the best measure of the severity of the injury in predicting the late sequelae of a head injury (Steadman and Graham 1970). Oddy (1985) predicts better prognosis in young adults in whom PTA is less than a week; such patients return within a few days to normalcy in their ability to cope with the demands of everyday living. On the contrary a more severe injury leads to persistence of deficits and interruption of the routine daily activities.

In the present study 72 patients suffered PTA and the mean duration was 11.85 days. The duration of PTA was found to affect social, personal, family and cognitive adjustments of the patients but their vocational adjustment was not disturbed (Table 38). As many as 82 head injured were main bread winners in their families and they resumed their work early because of financial demands on them. Extraneous factors like the support of the employer, the nature of employment like sheltered employment, and the adjustment of the co-workers are probably the reasons for the better vocational adjustment of these patients.
Most of the areas of family burden and family interaction (Tables 39, 40) did not show significant correlation with post-traumatic amnesia. Further investigation into this area may throw more light on this aspect.

Fracture of the skull is a frequent accompaniment of head injury. Skull fracture was seen in 44.5% of the head injured in the present study. Fracture of the skull indicates severe head injury while its absence does not mean otherwise (Miller 1966).

The dysfunction of the patients was not determined by the presence or absence of skull fracture in the present study (Table 41). Sabhesan et al. (1991a) also found no association between skull fracture and cognitive outcome. Burden (Table 42) and interaction (Table 43) also are similar in both the groups.

Brainstem signs are clinical signs which occur due to trauma to the brainstem (primary signs) or due to a blood clot pressing on the brainstem (secondary signs). The common brainstem signs are coma, dilated and fixed pupils of the eyes, difficult breathing, decreased heart rate, increased blood pressure, etc. There were clinical evidences of brainstem signs in 19 (7.27%) out of 110
patients. Patients with brainstem signs suffered more in the areas of social, personal, family and cognitive adjustment (Table 44). When patients with brainstem signs were compared with those without, it was found that vocational adjustment was poor in the former (mean: 64.22) than in the latter (mean: 56.94) though the difference was not statistically significant.

Disruption of routine family activities and disruption of family interaction were more common in the families of patients with brainstem signs than in those of patients without such signs (Table 45). Though the two groups did not differ significantly in other areas of burden, the burden in these areas was relatively greater in the families of patients with brainstem signs. Family interaction showed a similar pattern in both the groups (Table 46).

The patients under this study were classified into two groups depending on the presence or absence of early neurological deficits. Early neurological deficits include clinical signs of neurological impairment demonstrable during the acute recovery phase of cranial nerve palsies and focal signs such as hemiparesis, paraparesis and dysphasia. Patients who had early
neurological deficits showed greater dysfunction in social, vocational, family and cognitive spheres (Table 47). A tendency towards increase in personal dysfunction in patients with early neurological deficits is clearly seen though the difference between the groups is not statistically significant. Dye et al. (1979) opined that the presence of early neurological problems makes the prognosis poor and they found that early neurological problems led to poor neuro-psychological performance subsequently.

The presence of early neurological deficits was found to cause more disruption of routine family activities and leisure activities. Family burden tended to show an increasing trend in the families of patients with early neurological deficits in the rest of the areas also (Table 48) though the difference was not statistically significant. Family interaction is similar in both the groups (Table 49) of those with and without early neurological deficits.

Seizures are a common neurological sequelae of head injury and they may arise at any time, even many years after the injury. Jennett and Teasdale (1981) are of the opinion that seizures arise as a consequence of cortical damage and of the individual's susceptibility.
Stritch (1969) says that depressed fractures, penetration of dura (outer covering of the brain) and infection increase the risk of seizures. Post-traumatic seizures may affect the work, social, economic and home status of the head injured and he found unsatisfactory home and social adjustments frequently in those with seizures (Erculei 1969).

Early seizures were observed in 8.18% of the patients. The mean scores indicate that these were not found to have any impact on the adjustment of the patients (Appendix III, Table 1) family burden (Appendix III, Table 2) and family interaction (Appendix III, Table 3). Late seizures were found in 10% of the patients. The mean scores show that the patients with late seizures suffered from considerably more dysfunction than those without late seizures (Appendix III, Table 4). Burden in their families also showed an increasing trend (Appendix III, Table 5). There was not much difference between the families of patients with and without late seizures in interaction (Appendix III, Table 6). Among the victims studied 12.73% suffered late neuro-physical deficits. Late neuro-physical deficits refer to physical impairments due to neurological damage observed 36 months after head injury. They include cranial nerve palsies, special sensory
deficits, motor deficits, sensory loss, lack of coordination etc. In the present study weakness of a part of the body or particular limb and loss of vision or hearing on one side were observed. But these deficits were not incapacitating them, except in one patient who suffered from hemiplegia seriously. Thus, it may be said that dysfunction (Appendix III, Table 7), family burden (Appendix III, Table 8) and family interaction (Appendix III, Table 9) were not influenced by these deficits.

Alcohol dependence, which is a common problem among head injury patients is an important determinant of psycho-social outcome. In the present study 28.18 percent of the victims had clinical evidences of alcohol dependence prior to head injury. It is believed that alcohol abuse is the most common factor that complicates head injury (Sabhesan and Natarajan 1988b). Since alcohol causes cerebral damage and modulates behaviour (Sabhesan et al. 1987a) these patients are subject to poor psycho-social outcome. But alcoholic patients did not differ significantly in the various areas of dysfunction (Table 50). There are two possible explanations for this to be considered. At the time of the study many alcoholics had already either fully stopped drinking or reduced the
quantum of drinking. Secondly the alcoholics were dysfunctional even before the injury and the measurement of dysfunction takes into consideration the present level of functioning in comparison to the pre-trauma level.

Similarly no difference in burden (Table 51) and interaction (Table 52) was noticed between the families of the alcoholic and non-alcoholic head injury patients. Family burden and family interaction are heavily dependent on the dysfunction of the patients and in this study there was hardly any difference between the alcoholics and non-alcoholics as far as adjustment was concerned. Another reason could be that the families of alcoholics had by then adapted themselves to adjust with the patients and compensated the loss due to alcoholism.

A comparison of psycho-social dysfunction at the end of the 18th month after injury was made with that at the end of 36th month after injury and the results show that dysfunction diminished with the passage of time. A majority of the patients reached the pre-trauma state of psycho-social functioning (Table 53). Lessening of the burden at the 36th month follow-up compared to the 18th month follow-up, as found in this study (Table 54), is due to the reduction in dysfunction of the patient,
restitution of behaviour sequelae, vocational restitution, monetary compensation, support received from relatives in a few cases, etc.

In the long term follow-up of head injured patients, psychological morbidity is found to be the most disturbing factor (Sabhesan et al. 1987c). The extent of relationship between brain damage and psychiatric disability after head injury remains a problem of considerable practical and theoretical interest (Lishman 1968). According to Krupp and Schwartzberg (1968) any behavioural symptom can not be due to a single preceeding or predisposing event. Sabhesan et al. (1991c) opined that behaviour problems after head injury are due to the pre-trauma personality traits, cognitive deficits, or due to diffuse or focal brain damage. While the early psychiatric problems are due to organic damage and the resulting cognitive impairment, the late psychiatric sequelae are due to disturbed patient-environment interactions.

Psychological and organic factors operate together and influence each other in determining the psychiatric outcome. Psychiatric disorders after head injury are too many. Among them affective disorders such as irritability, anxiety and depression, behaviour
disorders such as amotivation, disinhibition, and excessive somatic concern have been taken into account for the present study. Some of these problems clearly reflect the struggle of the individual who is handicapped by impaired cognitive skills and by physical disabilities (Prigatano 1987).

Among the psychiatric sequelae, irritability is the commonest problem (39%) encountered in this study. Patients exhibiting irritability showed a greater degree of psycho-social dysfunction than those without irritability (Table 55). The researcher of the present study and others observed earlier that irritability was associated with maladjustments in social, vocational, personal and family spheres (Ramasamy et al. 1987b). Irritability in the context of head injury is of two types: (i) organic irritability and (ii) reactive irritability. In the former, neuro-impairment underlying the irritability with co-existing cognitive deficits accounts for the dysfunction of those patients who suffered from acceleration injuries, frontal and/or temporal lobe damage and alcohol dependence. In the cases of those suffering from reactive irritability, cognitive deficit and other persisting disabilities could have precipitated this affective disorder as well as
dysfunction. Irritability might also arise as a general reaction to the losses, frustrations and feelings of insecurity, without any aetiological relationship to the pre-trauma personality trait (Bond 1985).

Irritability with its associated psycho-social dysfunction, in turn, enhances family burden. The finding is that the burden experienced by the families of irritable patients is significantly more (Table 56). These families were also found to show poor interaction in most of the areas (Table 57).

The irritability of the victims may be mild or so severe as to make them behave violently, affecting the physical and mental health of the family members and disturbing the interaction and other functional aspects of the families. Snaith and Taylor (1985) opined that irritability causes distress to those around the patient. Irritability causes fear and anxiety among the relatives of the patients who learn to avoid provoking aggressive outbursts (Brooks et al. 1986).

Motivational disorders are frequently observed among head injury patients. According to Prigatano (1987) "Motivation is the arousal component of behaviour which regulates the development and execution of plans of
action. Disturbances in the brainstem and related structures alter the arousal and/or attentional mechanisms and cause motivational disorders. Sabhesan et al. (1989) attribute the amotivation following head injury to the damage to the cortex of the brain and the complex interaction between the neuro-psychological deficits of the individual and the environment.

Motivational disorders handicapped about a third of the patients studied (32.73%). Among these patients, at least 12 patients suffered from brainstem signs after injury and 14 patients suffered from frontal lobe damage. Other patients in whom the neurological damage was not evident, motivation was secondary to cognitive deficits. These patients suffered from more dysfunction than those without motivational disorders (Table 58). Their inability to convert their desire into action (Wood 1985), combined with neurological damage and cognitive deficits, cause dysfunction in their psycho-social aspects.

The study reveals that the families of patients with motivational disorders experience more burden (Table 59). These families are burdened because the patients do not respond adequately to the personal and family demands, and are grossly deficient in initiating and planning in any given family situation.
The families of these patients suffered more from strained interaction in most of the areas of family interaction (Table 60). The child-child interaction was not affected probably because the children could strengthen their interaction over a period of time.

Among behaviour disorders disinhibition of the patients requires greater attention. It occurs relatively in fewer patients, and less than other problems. It reduces the social morality of the patients. This behaviour is expressed mostly in the form of indecent acts, sexual offences which are inappropriate to the social living. This behaviour can be more distressing and threatening to others. Very often such patients are insightless. This problem is mostly related to the frontal lobe injury. Lack of perception and inability to control basic instinctual drives lead to such behaviour (Wood 1985).

In the present study disinhibition was found in 8 patients. Among these 7 patients had suffered frontal lobe injuries, except one who had suffered a parietal lobe injury. Lishman (1968) also has reported a case who had suffered damage in the right parietal lobe.
As disinhibited behaviour is aetiologically related to brain damage, especially to frontal lobe injuries, dysfunction is more in these patients (Appendix III, Table 10) in the present study. The mean scores indicate that the families of these patients are burdened more in all the areas than those of patients without disinhibited behaviour (Appendix III, Table 11). The effect of disinhibited behaviour is most annoying and intolerable to the family members. The plight of a father whose daughter exhibited disinhibited sexual behaviour was clearly portrayed by Sabhesan et al. (1987c).

The mean scores of interaction in the families of patients with disinhibited behaviour are considerably less in most of the areas than the families of those without disinhibited behaviour (Appendix III, Table 12) indicating strained interaction in the former group.

Somatic complaints without demonstrable physical basis occur in patients after head injury. They comprise of symptoms like headache, dizziness, fatigue, lack of energy, hypersensitivity to noise, conversion symptoms and hypochondriasis. The pathogenesis of such problems is mainly psychological mechanisms rather than organic brain damage. Lishman (1968) also found that somatic complaints
had little association with neurological indices. In the present study 16.36% of the patients suffered from excessive somatic concern. These symptoms were associated with the dysfunction of the patients (Table 61). The persistent cognitive impairment and other physical sequelae cause excessive somatic concern as well as psycho-social maladjustments. Somatic complaints serve as a defence mechanism by which a person focuses his anxiety on an organ or a function in order to preserve his psychological integrity (Violon and Mol 1987). Burden (Table 62) was common in the families of these patients mainly because of their dysfunction. However interaction was similar in the families of both the groups of patients in most of the areas (Table 63).

Depression is a common affective disorder after head injury. Depression includes feelings of worthlessness, hopelessness, guilt, loss of interest in work and family activities and decreased libido. Reitan (1952) found that depression occurred frequently than other mental symptoms.

Depression was not uncommon among the patients in the present study (25.45%). Among these except three all the other patients suffered from cognitive deficits,
13 had suffered from sexual problems and 7 patients suffered from neuro-physical deficits.

These deficits and psycho-social dysfunction impair their adaptive skills which lead to poor performance in all the spheres of adjustment resulting in a reactive depression. Though depression is a consequence of impaired adaptive skills, this symptom may affect the adjustment. Hence there is an association between psycho-social dysfunction and depression (Table 64). According to Sabhesan et al (1991c) conative disturbances in depression interfere with patients' initiative in interaction with others and this leads to social and vocational maladjustments.

Sometimes in assault injuries depression occurs as a reaction to the event of assault. In such circumstances, the patient diverts his aggression against himself, which further intensifies his state of depression (Orbaan 1986). In the present study two such cases were identified in whom one had aggressive impulses against the person who had assaulted him and in the other this reaction was both towards the person who had assaulted him and against society, and this depression was maintained. Psycho-social dysfunction, neuro-physical sequelae, sexual
problems, etc. of these patients collectively contribute to the family burden (Table 65) and to strained family interaction in most of the areas (Table 66). Family investment of selves in home and child-child interaction are not however affected.

Anxiety is known to develop after head injury. It occurs frequently and studies elsewhere also report this affective disorder. Lishman (1968) investigated the association between psychiatric disability and indices of brain damage and found that anxiety did not have any association with post-traumatic amnesia or the degree of brain tissue destroyed.

Features of anxiety were evident in 16.36% of the patients studied. These patients showed poor adjustment (Table 67). All the anxious patients in the present study suffer from cognitive deficits which aggravate their struggle. Head injury patients who are unable to deal with their cognitive confusion develop anxiety about life (Prigatano 1987).

The families of anxious patients suffered from more burden (Table 68) which could be mainly attributed to the dysfunction of these patients. However, the interaction of the families in most of the areas was not
altered by the presence of anxiety in the patients under study (Table 69).

Of the various components of adjustments the personal and cognitive adjustments are known to determine the rest of the components namely social, vocational and family adjustments. While the former two relate to physical and mental health, the latter three relate to their adjustment with social environment. Cognitive maladjustment is a primary consequence of head injury which is very often related to brain damage. Personal dysfunction in the context of head injury is partly due to the secondary consequence of cognitive deficits and partly due to primary damage like neuro-physical sequelae. Thus disturbances in mental and physical health of the patients lead to dysfunction in social, vocational and family spheres. In other words social adjustment is the tertiary pathway through which neurological and cognitive damages are expressed. Personal dysfunction and cognitive dysfunction had significant correlations with social, vocational and family adjustments individually and also cognitive and personal dysfunction showed a high degree of correlation (Table 70).
The study of Newton and Johnson (1985) highlights the fact that cognitive skills are important for social adjustment. The head injured are prone to develop cognitive and intellectual disturbances which impair their adaptive skills (Long et al., 1984).

Dysfunction is the net result of organic, functional and neuro-physical sequelae and the degree of it decides the productivity and dependence of the patient on the primary social support system namely the family. The stresses and strains of the families of head injury victims are prolonged. The psycho-social dysfunction of the head injured emerges as one of the most important determinants of family burden. Every area of dysfunction, viz., social, vocational, personal, family and cognitive dysfunction shows a high degree of positive correlation with family burden individually (Tables 71, 72, 73, 74, 75). The disturbances in the earning capacity, vocational skills, social mobility, family role, cognitive skills in dealing with the family affairs reduce the contribution of the patient to the family and the families are placed in such a condition that they have to look after the patient's welfare as well as meet the needs of the family. Though each sub-area of dysfunction shows a significant correlation with various sub-areas of family burden, the
impact of various sub areas of dysfunction on various sub-areas of family burden is not uniform. For instance vocational adjustment greatly influences the financial burden. Likewise personal and cognitive dysfunctions render the patients more dependent on their families thus depriving them of family leisure, routine activities, and interaction and affecting the physical and mental health of the family members. According to Sabhesan et al (1987b) the burden experienced by the family members is more due to the cognitive dysfunction of the patients than dysfunction in other areas of adjustment. According to them restoration of the cognitive skills assumes the priority among the felt needs of the families. The relatives expect the cognitive skills to be restored by one year after the injury and when the cognitive deficits persist beyond one year the families are overburdened. The impact of the dysfunction of the patients on the mental health of significant family members is great. Depression, anxiety, sleeplessness, fatigue, and hopelessness about the future are the common psychological symptoms observed among the close family members of the chronically ill (Shaw 1987).

The family is the primary social unit of an individual which provides basic needs, social identity to
the members and social togetherness among the members. From an ecological perspective, the family is a major 'environment' that affects the functioning of individual clients (Libassi 1988). Similarly any illness or dysfunction of an individual disturbs the family dynamics.

In the context of head injury the dysfunction of the patients causes disequilibrium in their interaction to play various roles in the family and the consequent reaction of the family members causes strain to the victim. Here the various components of family interaction are considered to understand the influence of psycho-social dysfunction over them.

Family interaction is a multi-way process in which each individual influences the behaviour of the others. It is the sum total of interactions of the family members and their interest in maintaining the home and it takes into consideration the family investment of selves in home, overall interaction, the interaction of husband and wife as marital partners and as parents, and their interaction with children, the interaction of the children with parents and the interaction among the children.

When a family member is suffering from dysfunction, each family member is disturbed in some way
or the other and patterns of interaction among the family members are likely to change.

Head injuries disorganise the victims and they fail to look after themselves and to discharge their responsibilities for the other members in the family. As a result, families are overburdened to meet the crisis. Head injury causes a crunch on the structure and resources of the family and arrests developmental changes. Patients' mental health and physical health are the fundamental factors in determining their dynamics which decide their degree of adjustment with their families. Here cognitive adjustment and personal adjustment measured by Dysfunction Analysis Questionnaire are those two fundamental factors namely mental health and physical health of the victims. It is clear that the dysfunction of the patients causes impediment to all the components of family interaction.

Cognitive and personal maladjustments and the resulting damages on the social functioning are responsible for the poor family investment of selves in home, like upkeep of the house, etc. (Tables 76, 77, 78, 79, 80). The family members of such maladjusted personalities are so preoccupied with the patients that they hardly find time to attend to the physical atmosphere of the home. Poor family investment of selves in home
indicates that the continued stress diverts their interest from keeping their home presentable (Ramanaiah 1983).

Family group patterns of interaction is the area which collectively takes into account the interaction of all the family members. These are affected as long as the patient is dysfunctional (Tables 76, 77, 78, 79, 80). Intrinsic deficits of the patients disturb their resiliency, flexibility and adaptive skills. As a result the communication among the members is disrupted, the closeness among the family members, mutual warmth and affection, mutual support and co-operation and mutual satisfaction diminish, and authority and role functioning are affected or altered.

The main area of family interaction affected is the one between husband and wife as marital partners. Patients' personality changes, changes in socio-economic status and disturbed inter-personal interactions are known to disturb marital adjustment. In the present study dysfunction of the patients is found to disturb marital adjustment (Tables 76, 77, 78, 79, 80). Among the married, the spouses mostly assume the role of care-giver and this role is not only stressful but also difficult. They feel too isolated and overburdened.
Marital adjustment reflects moreover the degree of compatibility that both the partners maintain for their common emotional, sexual, social needs, etc. and it denotes the extent of mutual respect and concern.

Sexual dysfunction, which is one aspect of the personal dysfunction, was identified in 17 cases with various degrees of severity, which also contributed to the difficulties in marital adjustment.

Any illness or dysfunction may either integrate or disintegrate the members, especially the marital partners, depending on the chronicity of the problem. Marital relation is bound to share both in the difficulties and in the responsibilities. As the dysfunction after head injury is chronic, its disruptive and disintegrative effects on the interaction are greater. Hence the spouses continue their relations with difficulties. While describing the marital adjustment of head injured patients with their spouses Ramanaiah (1983) opined that the partners may stay together but emotionally be separated from each other. According to him such marital partners lack free communication. The economic and social needs and the responsibility to rear the
children were cited as the reasons for their continuing relations in spite of their emotional divorce.

The dysfunction of the patient leads to changes in leadership and role-play within the family. Usually the spouse takes up the role of the family head. Many spouses fail to cope with the changed situation. Sometimes the wives of the injured feel that they have lost their husbands and that the injured is more like a child.

The interaction between husband and wife as parents is also affected by the dysfunction of the patients (Tables 76, 77, 78, 79, 80). The adjustments and the responsibilities that the parents share between them are the determinants of the welfare of the children. If the patient is a male, his dysfunctions restrict him from interaction with a broader society and he gets restricted to the family and the spouse has to extend her role with broader society. If the patient is a female her family roles are disturbed and the male spouse has to extend his role to certain basic aspects of the family. So strains are experienced. The dysfunction of the patient forces the spouse to bear the entire brunt of parenthood.
As the dysfunctional patient is incapacitated in his/her adjustments, he/she interacts poorly with children (Tables 76, 77, 78, 79, 80). The latter tend to interact closely with the non-injured parent.

A parent may long for more attention or support than a child could provide or a child may insist on doing a thing which the parent is still capable of. Such instances breed conflicts at home (Shaw 1987).

Children's interaction with parents depends on the amount of care given and control exerted by parents. Dysfunctions of patients shift their family responsibilities on the children if they were grown up (Ramanaiah 1983). The poor capability of the dysfunctional parent in taking care of the children and the pre-occupation of the uninjured parent in meeting the demands of the family leave the children uncared for. Under such circumstances the children are frustrated and either aggressively react or come out with grievances. These two extreme conditions are unhealthy and disturb the interactions.

In the present study the child-parent interaction is disturbed (Tables 76, 77, 78, 79, 80) because the children prefer to interact with the uninjured
parent who takes up the leadership at home and takes care of their emotional, social and economic needs.

Child-child interaction is not affected by the cognitive dysfunction (Tables 80) though there is a correlation of other areas of dysfunction with child-child interaction (Tables 76, 77, 78, 79). The injured parent poorly interacts with the children, and the uninjured parent is pre-occupied with taking care of the injured as well as the family responsibilities. So there exists a lacuna. To compensate this children interact closely among themselves.

Stressful life events among head injured patients were studied. It is well known that stressful life events cause distress. Stress refers to hardship and strain experienced by an individual. The concept of stress refers to disturbances which occur in the adaptive balance between a person and his environment. While some kinds of stress are zestful and challenging and contribute to growth and development, other kinds of stress are problematic and unmanageable, because they go beyond the usual coping limits or because the person perceives an imbalance between the coping demands and his or her coping capacity (Libassi 1988). According to Rochella (1968)
stressful event can turn into a state of crisis when the person has poor ability to cope with it. Stress is a subjective experience differing from person to person and is a product of the interaction of various factors like the coping capacity of the individual, the extent of the demand, previous experience, attitudes, motivation, etc.

In the context of head injury research, the association between life stress and head injury has three dimensions. The first is the contribution of life stress to the occurrence of head injury. Stressful life events may disturb cognition, leading the individual to maladjustment and thereby predisposing him to injury.

The second is stress which arises due to behavioural, cognitive and neuro-physical damages after head injury and is reflected in various areas of adjustment viz. social, vocational and family aspects. Sabhesan et al. (1991b) opined that the process of recovery from head injury was continuous with newer problems emerging during different phases of recovery. The stress events occurring during various phases of recovery were related to different psycho-social sequelae.

The third is the extraneous life events which may cause stress in the victim of head injury.
As the present study is on the late sequelae of head injury, the relationship between life stress and the occurrence of head injury was not considered. The various life events which occurred in the behavioural, cognitive and social dimensions were not identified as these events are reflected in the psycho-social dimensions, measured by the tools used in the present study. Stressful life events which occur independent of head injury were considered to understand their impact over the psycho-social outcome of head injury patients and their families.

According to the authors of 'Presumptive Stressful Life Events Scale' (Singh et al. 1983) up to 2 events in a year can occur normally in the life of an individual. In the present study the mean number of life events that had occurred was less than two (1.4 events). Hence the correlation between the life events score and outcome of the patients (Table 81) and their families (Tables 82, 83) was not significant.