REVIEW OF RELATED LITERATURE AND FORMULATION OF HYPOTHESES
CHAPTER II

REVIEW OF RELATED LITERATURE AND FORMULATION OF HYPOTHESES

With a view to seek some guidelines* from the previous researches, which could be helpful in formulating the present investigation, the results of some of the representative studies are discussed below. The present review is by no means exhaustive, it is an attempt to indicate the main trends in research and theory which have a direct or indirect bearing on the present problem.

Disordered states of balance, hearing and eyesight have engendered a vast literature both popular and scientific. Wise King Solomon said in antiquity: "The hearing ear and the seeing eye, the LORD has made them both" (Proverbs 20:12). Hippocrates described the symptom of vertigo between the years 460 and 377 B.C. The word Vertigo was used in one of the oldest books of medicine, "The Papyros Ebers" which was written in Egypt between the years 1553 and 1550 B.C.

Agonies resulting from sensory disturbances prompted the English philosopher Thomas Hobbes to note in his treatise 'Leviathan' (1651): "There is no conception in a

* What is already known, what others have attempted to find out, what problems remain to be solved, what methods of attack have been promising or disappointing, the techniques and methodology followed by earlier investigators etc.
man’s mind, which hath not at first, totally or by parts, been begotten upon the organs of sense." Charles Baudelaire (1821-1867), a distressed French poet, wrote in his Intimate Journals :" Now I suffer continually from vertigo, and today, 23rd of January 1862, I have felt the wind of the wing of madness pass over me" (cf. Finestone, 1982).

Marie Jean Pierre Flourens (1824) was the first to suggest that the acoustic nerve consisted of two parts, a cochlear part concerned with hearing, and a vestibular part integral to equilibrium. In 1828, he announced that a lesion of the semicircular canals in the internal ear of pigeons causes peculiar movements of head and loss of balance. After an important lag phase the results of Flouren’s findings were introduced into the clinical field.

The importance of the inner ear in respect to vertigo was not known when the first book on otology was written by the Irishman Sir William Wilde. Though this famed scientist was interested in many things like archeology, statistics, and writing, he did not have any idea that vertigo could have found a place in his book (cf. Jongkees, 1978).

Nevertheless, the dizzy, the giddy and the vertiginous were known in the country of Swift, and Wilde had written ‘The closing years of Dean Swift’s life’. Julius Caesar, Martin Luther and Dean Swift, all suffered from Meniere’s disease. Meniere’s historical trio, but to them
Meniere’s traid was unknown before its description by the Master. Jongkees (1978) cites from Wilson’s (1943) book, ‘A Victorian Doctor’ : ‘The truth is that Swift suffered from Meniere’s disease which attacks its victims periodically with extreme suddenness, plunging them into paroxysms of giddiness, and violent sickness, and leaving them a legacy of head-noises and deafness which may persist until the next attack. Swift did not himself realize that these three symptoms were related. After all, why should he ? Giddiness is apparently an ocular manifestation, and vomiting an abdominal one, and it was not suspected for a century after Swift’s death that the three symptoms were really caused by a single disorder, and that an affection of the internal ear’ (p.294).

Labyrinthine vertigo was described in detail by Prosper Meniere in 1861. The importance of Meniere’s description of the disease or symptom-complex which bears his name is that, until then, vertigo was regarded as due to an intracranial disorder; he showed that it could be due solely to an affection of the inner ear.

The form of aural vertigo first described by Meniere was again noted by Jean Martin Charcot in 1874 by Latin title as "Vertigo ab aure Laesa". Goltz (1870) demonstrated the relation of vertigo and vestibular disturbance, showing that the former is a result of disease or irritation of the semicircular canals.
A French physician, Felix Gerlier (1840-1914) described that Gerlier’s disease or "paralyzing vertigo " is due to herpetic inflammation of the geniculate ganglion. Vestibular neuronitis consists of acute vertigo accompanied by nystagmus, nausea, vomiting, and prostration.

Marcel Lermoyez (1858-1929), French otolaryngologist, described a variant of Meniere’s disease-Lermoyez’s syndrome, in which deafness and tinnitus precede the first attack of vertigo by months or years.

The researches of Robert Barany (1876-1936), otolaryngologist of Vienna and Uppsala did much to clarify our knowledge of the vestibular mechanism. Barany’s syndrome-unilateral deafness, vertigo, and pain in the occipital region was described by him in 1911. He was awarded the Nobel prize in medicine in 1914 "for his work on the physiology and pathology of the vestibular apparatus".

Walter E.Dandy, of Baltimore, Cushing’s colleague at the John Hopkins hospital, advocated sectioning the vestibular nerve for relief of intractable labyrinthine vertigo. His paper "Meniere’s disease : its diagnosis and a method of treatment ", appeared in 1928.

In 1938, Charles S.Hallpike and Hugh W.B Cairns of the Ferens Institute of Otology, Middlesex Hospital, and Department of Neuro-surgery, London Hospital, intially described the characteristic histologic changes in the Meniere’s disease.
The review of the literature reveals that investigators continued to show interest in the examination of vertigo from different perspectives.

A miserable affliction, the disorder occurs in man and in lower animals. Usually produced by disturbances of the inner ear and its pathways to the brain, vertigo has many ramifications involving body-mind integration and function. Some conditions causing it are: infections of the middle and inner ear, meningitis, allergy, brain tumors, strokes, and certain neurological diseases such as multiple sclerosis. Vertigo may also follow head injuries, skull fractures, or any condition that produces bleeding into the inner ear or its nervous connections or that abruptly shuts off the blood supply.

Normal balance (proper orientation in space) is maintained by coordination of three body systems:

1. The muscles and joints of the body;
2. The eye muscles;
3. The end organs of equilibrium, located in the inner ear and consisting of three tiny, sensitive semicircular canals so adjusted that body motion in any direction stimulates one or more of them.

Dizziness is a subjective symptom, not a specific disease. In its mild form it may be a sensation of giddiness, weakness, positional insecurity, or unsteadiness. Its more severe form-called 'vertigo' is a feeling of spinning or whirling, often accompanied by sweating, nausea, and...
vomiting, and inability to stand. The causes of vertigo can be organic or psychic, central or peripheral, postural or drug related.

"The overwhelming vertigo, the awful sickness and the turbulent eye movements all enhanced by the slight movement of the head-combine to form a picture of helpless misery that has few parallels in the whole field of injury and disease" (Cawthorne, 1945). Cawthorne gave this graphic and frightening description of a patient suffering from a sudden attack of vertigo, in this case the result of accidental or surgical trauma. His description makes us aware that vertigo can be an acutely serious prostrating complaint, one that every physician has to take seriously.

Vertigo, a term derived from the Latin 'vertere' to turn, in the literal sense implies a sense of rotation. It is a condition in which the individual (subjective vertigo) or his surroundings (objective vertigo) seem to whirl or swim. Among the various perceptions studied, a turning sensation inside the head and a rocking sensation of the whole body were found to be closely correlated to a high frequency of functional symptoms. Apart from the absence of functional symptoms, indications of non-functional vertigo may be vertigo perceived as a spinning sensation around the head, frequently of 2-5 hr. duration, and vomiting in connection with vertigo. Thus, psychogenic vertigo is more likely to involve the subjective sensation, whereas
somatogenic vertigo more often involves the objective sensation. Whether organic or psychogenic, vertigo may be related to position and be accompanied by a sensation of imbalance. It is as serious a mistake to treat organic disturbance psychiatrically as to treat a psychological disturbance organically. In each case the result may be disastrous.

The following pages deal with:

(A) Psychological aspects of patients with vertigo.

(B) Audiovestibular findings in patients with vertigo.

(A) Psychological aspects of patients with vertigo

Patients who present symptoms of dizziness or vertigo are rarely first seen by psychiatrists. Most patients with these symptoms are referred to a psychiatrist only after an extensive medical and neurological workup has proven negative for organic causes. Some are referred early in their workup if their complaints include other symptoms suggestive of a psychiatric disorder such as anxiety or depression. But these tend to be in the minority.

Despite the paucity of literature in this area, the psychological aspects of vertigo are crucial in developing a rational approach to the diagnosis and treatment of these disorders. Vertigo is defined as the sensation of movement or rotation in space. The environment may rotate in any plane about the patient or the patient may
feel himself rotating in space (Engle, 1962). Psychological factors often play a crucial role with these symptoms, be they etiological or as sequelae to organic disease. A number of E.N.T clinicians have, based on their personal contact with their patients, voiced the impression that psychological factors play a more important role in the causation and course of the disease than is commonly realized. Jongkees in particular has given a vivid description of the personality of these patients and their emotional reactions to the fright of the attacks; he has also included some simple psychotherapeutic guidelines in the recommendations for treatment. Thus, the elucidation of the psychological etiology of vertigo should now be a challenge to the unravelling of its physiology.

Freud (1895) regarded vertigo as a central symptom of anxiety neurosis when he described that syndrome. By vertigo he did not mean hallucination of rotation but, rather, locomotor or coordinatory vertigo. Freud also noted vertigo as a very common precursor to agoraphobia.

Psychoanalysts have produced a variety of explanations of psychogenic vertigo. Some of these explanations, however, are rather speculative. Schilder (1927) viewed vestibular dysfunction as often being the expression of two conflicting tendencies and as serving as a danger signal to the ego much like the role of anxiety in traditional analytic thinking. Hadley (1927) felt vertigo
was related to self-destructive tendencies. French (1929) reported a patient whose dizziness was an expression of a conflict between passive desires (delight in passive motion and passive homosexual desires) and a struggle to assume a more active role. Schilder (1933, 1939) hypothesized that psychogenic dizziness had its roots in infantile experiences. Clinging in babies is, he argued, intimately associated with sucking, and later it is important in maintenance of an erect posture. It is also suggested that when threatened with loss of mental equilibrium, one response is to feel dizzy and physically unbalanced. Schilder also argued that neurotic conflict can also have a direct effect on the vestibulo-cerebellar system, inducing dizziness. As evidence for this claim he cited studies by Bauer (1916), who noted that past-pointing could be induced by suggestion under hypnosis, and Leidler and Lowemy (1923) who observed spontaneous nystagmus in 64 out of 78 neurotics studied. Schilder also suggested that dizziness is a symbolic representation of the inability to coordinate diverse impulses. Dizziness signals danger to the ego, that is, that it is not balancing demands of instinct and society, id and super-ego. He noted that dizziness is often experienced at the end of a psycho-analytical session. Rather than attributing this to postural changes, he saw this as related to changes, in psychic states as the session ends!

Fenichel (1945) noted that dizziness may replace
the fear of falling as a symptom of sexual excitement or as
punishment for unconscious hostility. Weiss and English
(1957) recognized that psychic insecurity is well expressed
by unsureness of balance.

Fowler and Zeckel (1952,1953) argued strongly that
there is indeed a psychosomatic factor in Meniere’s disease.
They suggested that this effect was mediated through
haemorrhage or spasm of the blood vessels in the labyrinth,
inducted by blood sludging. They reported on 23 patients,
whom they divided into five groups on the basis of the type
of stress involved in precipitating either particular attack
or the disease itself. These categories were antagonism with
someone important to the patient; sexual abstinence; sexual
conflicts; bereavement; various others stresses.

Hinchcliffe (1967c) has further attempted to
implicate emotion as a precipitating factor in vertigo
attacks in patients with Meniere’s disease. He concluded
that Meniere’s disease is indeed psychosomatic because
patients with Meniere’s disease had an increased prevalence
of the so-called psychosomatic type personality profile on
the Minnesota Multiphasic Personality Inventory (MMPI),
compared with a control population with otosclerosis. On the
other hand, Pulec (1972) has stated that "emotional or
psychiatric factors are not involved in the etiology of this
disease".

Moore and Atkinson (1958) concurred that
psychogenic dizziness is motivated. On the basis of patients they had seen, they claimed that two basic psychological processes are involved—symbolic representation of psychological disorientation and imbalance, and punishing other people and avoiding certain situations (secondary gain). They also claimed that all such patients had had neurotic problems before the onset of vertigo. The psychogenic patient often gives a highly colored and dramatic account of his complaint, more so than will other sufferers.

Clinicians continued to show increasing interest in the psychological aspects of those suffering from vertigo. However, the role of emotional factors in patients with vertigo has been widely debated. Clinicians have frequently observed apparent peculiar personality characteristics in patients with vertigo, such as aggressive dependency, emotional lability, and overreactivity. Perhaps because of this, several studies have attempted to establish the extent to which emotional factors are involved in patients with vertigo. Of particular interest is the personality of many patients with active Meniere’s disease. These individuals often exhibit high levels of anxiety on initial presentation compared with patients with hearing loss, tinnitus, otalgia or dizziness due to other causes.

Rallo (1972) suggested that dizziness can be seen as a ‘depersonalization limited to the spatial area’.
Patients often experience not simply sensations of movement but also distortions of body shape. Giddiness has also been interpreted as ‘sadomasochistic impulses against a cruel super ego’.

Magnusson, Nilsson and Henriksson (1977) postulated that dizziness occurs as an anxiety equivalent in psychogenic patients with vertigo. They used two projective techniques to assess anxiety, and the spiral-after-effect (SAE) and found no difference on the SAE techniques in the production of defence mechanisms, but the vertigo patients did manifest more signs of anxiety on the projective tests.

Afzelius, Henriksson and Wahlgren (1980) observed that vertigo was psychogenic in 66% of patients who were seen in an otolaryngology practice for this complaint. Their determination was based on the primary complaint of vertigo accompanied by two or more of the following symptoms: blurred vision, drop attacks, feelings of unreality, and general nervousness. Only 1/3 of the vertiginous patients in an otologic practice suffer from a somatic disorder. In patients with vertigo of functional origin eye-closure tends to release rather than inhibit nystagmus. The authors further concluded that it is essential in practical clinical work to direct interest towards a differentiation between somatic and nervous sources of vertigo.

Hallam and Stephens (1985) administered a standardised test of psychopathology (CCEI) to tinnitus
sufferers some of whom also complained of dizziness. Subjects complaining of dizziness obtained much higher scores on ‘phobic’ and ‘somatic’ anxiety scales in particular. The dizziness was completely unrelated with objective assessments of balance.

Brightwell and Abramson (1975) in order to further investigate the role of personality and its relationship to the symptoms of vertigo, administered the Eysenck Personality Inventory (EPI) and the Cornell Medical Index (CMI) to 56 outpatients seen at the University of Iowa Clinics with diagnoses in the following groups: (1) Meniere’s disease (N=13); (2) non-Meniere vertigo (N=18); (3) otosclerosis (N=13); (4) lymphoma (N=12). Patients with vertigo were evaluated with a complete history, general and neurological examination, electronystagmography, routine laboratory screen including a VDRL, and a complete audiometric battery. Patient’s conditions were diagnosed as Meniere’s disease if they had episodic vertigo plus a sensory type hearing loss. Patients with true vertigo who did not fulfill criteria for Meniere’s disease were placed in the non-Meniere vertigo group. Otosclerosis was diagnosed according to standard audiometric and clinical criteria. Patients with lymphoma had been diagnosed by clinical and laboratory examination and were all receiving chemotherapy for their illness.

The study revealed numerous significant positive
correlations between personality test scores and symptom severity in patients with Meniere’s disease. The authors were unable to differentiate the groups on the basis of their personality test mean scores. However, the results suggested that emotional factors play a role in the severity of symptoms. The authors concluded that "this study does not implicate emotion as an etiological agent. Rather, it suggests that there are some patients in whom emotional factors play an important role in the severity of symptoms experienced. Perhaps the concept of psychological vulnerability as developed by Canter et al. (1972) explains these findings. It would appear that some patients can be identified purely by psychological testing, hence the term psychological vulnerability, who will experience substantially more difficulty with certain illnesses than those patients who are not psychologically vulnerable" (p.366) The authors further stressed that it seems important, we do not dismiss the role of emotional factors in patients with Meniere’s disease as some have suggested. Further study in this area seems warranted.

Stephens (1975) using a broad definition of Meniere’s disease, contrasted a Meniere’s disease group (N=104) with a group of patients with idiopathic peripheral vertigo (N=62). The author administered two personality questionnaires-the Eysenck Personality Inventory (EPI) and the Crown Crisp Experimental Index (CCEI). The author found
that Meniere’s disease group was significantly more pathological than the general population on all of the CCEI scales and on neuroticism and lie scales of EPI. They had a reduced score on extraversion. Another noteworthy finding was an elevated obsessionality score in patients with Meniere’s disease and the author postulated that patients with Meniere’s disease are of "a certain personality type" and when episodic vertigo occurs, compulsiveness becomes enhanced.

Crary and Wexler (1977) compared Meniere’s patients with vertiginous control subjects without Meniere’s disease in whom the etiologies were known (e.g., viral, luetic, infectious disease). In comparing these two groups by a wide variety of personality measures (such as anxiety scales, physical symptom check lists, and the Minnesota Multiphasic Personality Inventory) no evidence was found of psychophysiologic processes in patients with Meniere’s disease. There was no evidence that they repressed their emotions. They did not show increased overt tension, or increase in defensiveness, or denial. Measures of neurotic tendencies were normal. There were no differences in the number of psychosomatic symptoms and no predominant personality type. Thus, when the patients with Meniere’s disease were compared with other vertiginous patients with disorders of known organic etiologies, there were no psychologic differences.
When either group of vertiginous patients was compared with these same measures to nonvertiginous otologic patients, many differences appeared. The vertiginous groups seemed more distressed and more disturbed. They were more anxious, experienced a higher mean number of psychophysiological symptoms, had higher hysteria and hypochondriasis scores, and showed a great frequency of psychophysiological personality profiles. Thus, on the basis of increased psychopathology, when contrasted to the non vertiginous group, either the Meniere’s or the non-Meniere’s vertiginous group could have been said to show a psychophysiologic or stress basis for the disease.

The research conducted by House, Crary and Wexler (1980) indicates that Meniere’s disease is not caused by psychologic disorders. The psychological profile is not significantly different in Meniere’s and non-Meniere’s vertiginous patients. The patient should be treated for his physical disease and be given support for the emotional effects of vertigo and other symptoms. Meniere’s disease causes emotional problems. Emotional problems do not appear to cause Meniere’s disease (p.629).

Groen (1983) presented the results of a study of the personality structure, youth development and the role of interhuman conflicts in the work situation and the family, in the causation and course of Meniere’s disease, the somatopsychic reactions of the patients to the illness, and
the principles of a form of psychotherapy which was combined with the regular E.N.T check-ups and treatment.

The following information was revealed (Groen, 1983, p. 408):

<table>
<thead>
<tr>
<th>YEAR OF BIRTH</th>
<th>AGE AT ONSET</th>
<th>PROFESSION</th>
<th>OTHER (PREVIOUS) DIAGNOSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1933</td>
<td>37</td>
<td>Senior civil servant</td>
<td>Social anxiety; hyperhidrosis</td>
</tr>
<tr>
<td>1936</td>
<td>38</td>
<td>Industrial manager</td>
<td>Cigarette addiction (stopped)</td>
</tr>
<tr>
<td>1924</td>
<td>43</td>
<td>Statistician (insurance co.)</td>
<td>Social anxiety; Prolapsed disc; impotence.</td>
</tr>
<tr>
<td>1927</td>
<td>46</td>
<td>Industrial director</td>
<td>Migraine</td>
</tr>
<tr>
<td>1940</td>
<td>(307) 34</td>
<td>Construction engineer</td>
<td>KZ syndrome; Irritable bowel</td>
</tr>
<tr>
<td>1928</td>
<td>44</td>
<td>Librarian</td>
<td>Gout, polycythaemia, hypercholesterolaemia, obesity, hypertension</td>
</tr>
<tr>
<td>1919</td>
<td>57</td>
<td>Industrial director</td>
<td>Neuroasthenia; ventricular extrasystole</td>
</tr>
<tr>
<td>1925</td>
<td>47</td>
<td>Post office branch director</td>
<td>Chronic rheumatoid arthritis; Hypertension</td>
</tr>
<tr>
<td>1940</td>
<td>30</td>
<td>Motor car engineer</td>
<td>Brain concussion; Height fear</td>
</tr>
<tr>
<td>1929</td>
<td>49</td>
<td>Metalworker (supervisor)</td>
<td>Pernicious anaemia;</td>
</tr>
<tr>
<td>1945</td>
<td>32</td>
<td>Physician</td>
<td>Migraine, depression</td>
</tr>
<tr>
<td>1928</td>
<td>45</td>
<td>Plasterer (supervisor)</td>
<td>Hypertension; Hysterical personality; Aspirin and valium addiction</td>
</tr>
<tr>
<td>1942</td>
<td>28</td>
<td>Road maker</td>
<td>Gout, polycythaemia, hypercholesterolaemia, obesity, hypertension</td>
</tr>
<tr>
<td>1928</td>
<td>32</td>
<td>Gas stove engineer</td>
<td>Migraine; Prolapsed disc?</td>
</tr>
<tr>
<td>1950</td>
<td>20</td>
<td>Family doctor</td>
<td>Recurrent pyelocystitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR OF BIRTH</th>
<th>AGE AT ONSET</th>
<th>PROFESSION</th>
<th>OTHER (PREVIOUS) DIAGNOSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1919</td>
<td>55</td>
<td>--</td>
<td>Dyskinesia of gallbladder, Migraine, depression</td>
</tr>
<tr>
<td>1929</td>
<td>41</td>
<td>Civil servant</td>
<td>Hypertension; Climacterium</td>
</tr>
<tr>
<td>1914</td>
<td>58</td>
<td>(Secretary)</td>
<td>Hypertension</td>
</tr>
<tr>
<td>1939</td>
<td>37</td>
<td>(Sales girl)</td>
<td>Hysterical personality; Aspirin and valium addiction</td>
</tr>
<tr>
<td>1921</td>
<td>56</td>
<td>Secretary</td>
<td>Migraine; Prolapsed disc?</td>
</tr>
<tr>
<td>1927</td>
<td>52</td>
<td>(Sales girl)</td>
<td>Duodenal ulcer (gastric resection)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Prolapsed disc (3 operations)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Recurrent pyelocystitis</td>
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The majority of the patients belonged to the middle social class. Among them were some of lower social origin, but by doing well at school and continued studies they had improved their positions so that they belonged to the middle class when the disease began.

The study revealed that it was rare in children, occurring usually during adulthood and middle age. The author further found that there was a tendency to be quiet, restrained, well equilibrated, correct and civilized behaviour. They clung so rigidly to their strict life style that people who knew them well also regarded them as 'exaggerated perfectionists'. Another feature as an exaggeration of a valuable character trait was that these patients took not only their work but all aspects of life very seriously and were unable to participate and enjoy superficial conversation. In general, a recurrence of the same conflict which had been operative before the disease started was responsible for the similar symptoms. Slater (1988) also emphasised that Meniere’s disease has a peak incidence between ages 40 and 60, but the incidence varies widely.

Rigatelli, Casolari, Bergamini, and Guidetti (1984) examined 60 consecutive patients with vertigo using three self rating scales (Zung’Self-Reporting Depression Scale, and the Middlesex Hospital Questionnaire). The authors concluded that the behavioral and relational limitations
that result from symptoms of vertigo have tremendous influence on the psychic sphere. During the same period Towler (1984) concluded: "Psychiatric and emotional problems are a common cause of dizziness. Hyperventilation can be confirmed if the patients symptoms are provoked by voluntary overbreathing for three minutes. Chronic continuous dizziness may be a sign of depressive illness. Emotional factors may influence symptoms of organic origin, for example, stress may provoke bouts of Meniere's disease as it does asthma and migraine."

Payk (1985) stressed that for the symptom 'vertigo', a psychogenic cause must be considered, if organic failures are excluded by a complete examination. The author viewed such troubles as symptoms of endogenous psychosis and anxiety neurosis, especially aerophobia like agoraphobia, gephrophia, and batophobia. In these cases dizziness appears as a covered form of anxiety.

According to Coker, Coker, Jenkins, and Vincent (1989), at least three perspectives appear in the literature to explain the relationship between Meniere's disease, personality characteristics, and stress. Early research presented evidence that psychological factors played a significant role in the development of Meniere's disease. Some investigators have concluded that patients with Meniere's disease have an anatomic predisposition and that psychic factors determine the symptoms and its severity.
(Siirala and Gelhar, 1977), while others have examined the relationship between Meniere’s symptoms and psychological stress and concluded that psychic stress intensified the symptoms of Meniere’s disease (Lucente, 1973; Fowler, 1953).

The authors examined the psychological profile of patients with Meniere’s disease. Patients with Meniere’s disease were solicited from the Otolaryngology- Head and Neck Consultants of the Baylor College of Medicine, Houston, Tex. The diagnosis of idiopathic endolymphatic hydrops was established by history, otologic examination, and audiometric findings. Dizziness questionnaire characterizing the type, frequency, and severity of dizziness were completed to complement the medical history from the patient record. Only those individuals with documented fluctuating sensorineural hearing loss or sensorineural hearing loss, evidence of hydrops by electrocochleography (elevated summating potential), and a history of recurrent vertigo underwent psychological assessment. Two populations were differentiated on the basis of vertigo: active vs inactive. Vertigo was defined active if the patient had experienced at least one episode of severe vertigo within 3 months of the psychological battery or if he or she suffered persistent dysequilibrium for at least 3 months prior to examination. To assess the degree to which psychological factors operate in Meniere’s disease, two objective personality instruments were administered in a supervised test environment: the
Minnesota Multiphasic Personality Inventory (MMPI) and the Diagnostic Inventory of Personality and Symptoms (DIPS). A clinical diagnosis of depression (axis I) was evident in 80% of the patients with active vestibular symptoms examined by MMPI and 70% by DIPS compared with 32% (MMPI) and 39% (DIPS) in the inactive group. The data support the addition of depression to the clinical picture of active Meniere’s disease.

The authors concluded: "The high incidence of depression in those individuals with recurrent or chronic dysequilibrium due to vestibular disease appears to be a significant problem in our population of patients. While depression is rarely fully addressed in the initial evaluation of otologic symptoms, our results support further investigation and management of those individuals with active dysequilibrium not responding to the conventional medical and surgical therapies. Psychological assessment, consultation, and the use of antidepressant medications may prove beneficial to the overall well being of the patient and provide an adjunctive treatment for Meniere’s disease" (p.1357).

Quinodoz (1990) felt that vertigo is an expression of separation anxiety; we can observe the vicissitudes of the object relationships by way of the development of this symptom in the treatment. He identified different forms of vertigo according to the particular stage reached by the
Audiovestibular findings in patients with vertigo

The entity known as Meniere’s disease or endolymphatic hydrops must be distinguished from all other forms of vestibular vertigo. Many patients with dizziness or a variety of forms of vertigo are erroneously labeled as having Meniere’s disease. This label is not only an error in diagnosis but may have a serious psychologic effect on the patient. Meniere’s disease is characterized by chronicity, multiple attacks with varying degrees of resulting disability, periods of remission with unforeseen exacerbations, generally progressive hearing loss, a significant incidence of bilaterality, and no likelihood of causal treatment or true cure. Given all of the above, this diagnosis should be entertained with great caution and should be used only when the signs and symptoms are clearly consistent with the known natural history of the condition.

Meniere’s disease or endolymphatic hydrops is characterized by attacks that typically include a feeling of pressure in the ear, increased tinnitus, decreased hearing, and vertigo. These attacks may be very brief, lasting only a few minutes, but they often last several hours. They
typically occur in groups and are followed by a period of remission, which may be measured in days to years. At the onset, symptoms may be purely auditory, or less frequently vestibular; but ultimately, the full-blown picture almost always emerges. The pathophysiology is thought to be the dilatation of the endolymph-containing spaces of the inner ear, hence the name endolymphatic hydrops. It is currently not known what causes this dilatation or if, in fact, it is the primary factor in the condition, or the result of it. (cf. Cohen, 1991; p 1257).

The review of some of the studies regarding the audio-vestibular findings in Cervical Spondylosis, Benign Paroxysmal Positional Vertigo (BPPV), Meniere’s disease, Hypertension, and Psychogenic vertigo is discussed in the subsequent pages.

**Cervical Spondylosis**

Cervical vertigo is defined as 'Vertigo induced by changes of position of the neck, in relation to the body'. Since the early work of Barany (1918), it has been known that movements of the neck may provoke attacks of dizziness and induce nystagmus (Voss, 1925; dekleijn and Nieuwenhuyse, 1927).

Three mechanisms have been postulated to explain vertigo of cervical origin:

1) Sympathetic irritation resulting in vertebro-
basilar ischaemia (Barre, 1926).

2) Intermittent vertebral artery compression by osteophytes, caused by cervical spondylosis (Sheehan, Bauer, and Meyer, 1960).

3) Deranged somatosensory input from the cervical kinesthetic receptors (Dejong, 1967).

Osteophytic outgrowths develop posteriorly about apophyseal articulations and anteriorly about the disc spaces (Turek, 1984). Osteophytic compression is often most pronounced at C5-C6 spaces, less often at C4-C5 space (Bartschi-Rochain, 1949). Cervical spondylosis may produce no symptoms and findings although the condition is obvious in roentgenograms. On the other hand, the degenerative process in its early stage may not be visible, yet it may cause symptoms. Usually, one severe trauma or repeated small traumas, are necessary to cause irritation about the irregular facets and reactive inflammatory synovitis.

The patients affected by these conditions usually present with complaints of dizziness and nystagmus precipitated by rotation and hyper-extension of the neck. The incident lasts but a few seconds to several minutes, rarely longer, but subsides completely.

Hallpike (1962) reported that there was no constant electronystagamographic pattern or derangement related to VBI in cervical spondylosis. Montandon and Freedman (1967), on the contrary, reported a characteristic
vestibular syndrome on Electronystagmographic (ENG) examination of patients with vertebral artery disease. Thiebaut et al (1967) reported bilateral reduction of postcaloric responses in 2/3rd of patients. Barber and Dionne (1971) reported 3% incidence of positional nystagmus in their series, and no other significant changes in ENG examination of these patients.

Luxon (1980) reported that a high proportion of the patients with cervical spondylosis had audiogram that was considered to be outside normal limits, despite the fact that these patients usually do not complain of hearing loss.

More recently, Mann, Gill, Mehra and Ravi (1988) reported that no specific abnormality was identified on caloric testing, though there were certain random abnormalities. Audiological examination revealed recruiting type of symmetrical hearing loss, in 9 of the 26 cases (36%). Mann, Mehra, and Rattan (1990) found vestibular functions to be within normal limits and reported that 15% of the patients studied had high frequency SN loss.

**Benign Paroxysmal Positional Vertigo (BPPV)**

BPPV is the most common type of all positional vertigo and is the prototype for peripheral causes. Barany (1921) first became aware of the strange and dramatic vertigo which occurs in certain head positions and described the condition as otolithic nystagmus. Dix and Hallpike
(1952) coined the term benign positional vertigo and proposed a vascular lesion affecting the otolithic organ. Schuknecht (1969) referred to it as cupulolithiasis.

Several classifications were proposed by different authors—Nylen (1950), Aschan (1956).

**Nylen and Lindsay classification**

Type I : If the direction of nystagmus changes with the head position (direction-changing).

Type II : If the direction of nystagmus does not change with the head position (direction fixed).

Type III : If the nystagmus varies regularly from type I to type II (Irregular type).

**Aschan classification**

1) Persistant or Tonic : Nystagmus is maintained as long as head is kept in that position.

2) Transitory : Nystagmus lasts for only few seconds.

Recognition of a post traumatic syndrome including dizziness and/or vertigo, after head and neck injuries is well recognized, but it is relatively recently that an organic vestibular basis, as opposed to a psychogenic aetiology has been established (Hart, 1973; Pearson and Barber, 1973; Rubin, 1973).
Severe head injuries resulting in skull fractures, especially transverse ones through the petrous temporal bone, almost invariably cause damage to the semicircular canals and often the cochlea. Most of the patients have abnormalities of caloric response but auditory symptoms are less frequent than vestibular ones. The symptoms of vertigo frequently develop after a symptom-free interval of some days or weeks. The patients then complains of brief, but severe episodes of rotational vertigo lasting less than a minute, upon sudden changes of head position, especially on lying down and turning towards the affected ear.

Results of the caloric tests after head trauma vary greatly depending on the severity of the injury and the localization of the skull fracture (Kotova, 1962; Davey, 1965; Caveness, 1966; Harrison and Ozsahinoglu, 1972; Scherzer, 1975).

Pearson and Barber (1973) could not demonstrate any correlation between the severity of the injury and the results from caloric tests or changes in hearing.

Harrison et al. (1972) stated that in cases of positional vertigo associated with head injury, it was exceptional to find that caloric responses are defective. Mann, Mehra, and Rattan (1990) reported normal vestibular function tests in their study on patients with vertigo.

The incidence of dizziness and vertigo in patients with fracture of temporal bone has been reported to range...
from 75-93%. The average incidence of vertigo for other types of skull fractures is 56% (Toglia, 1976). The nystagmus occurs in about 42% of cases with temporal bone fractures (Toglia, 1976). BPPV has a tendency to become postural and disappear in a few weeks (Gordon, 1954; Barber, 1969).

Post-traumatic puretone audiograms frequently show lowered hearing capacity at 6 and 8 KHz (Proctor et al. 1956; Langa & Kornhuber, 1962; Schuknecht, 1969; Toglia et al. 1970; Escher, 1973; Lehnhard, 1974). Hearing impairment is generally sensorineural. The incidence rate varies between 30-70% depending on the severity of trauma (Practor et al. 1956; Kantanen et al. 1967; Toglia et al., 1970). As a rule hearing is improved within a few weeks but at high frequencies, the recovery is slight (Hough, 1969; Toglia et al., 1970). Impaired conductive hearing has also been detected after head injuries, particularly with fracture of the temporal bone. (Toglia, 1971).

Tuohimaa (1978) reported that highly significant (P<0.001) deteriorated hearing results at 4, 6 and 8 KHz were established for trauma patients primarily and 6 months after trauma when compared with the control group. At 4kHz (20.7dB) and 8KHz (22.0dB) mean hearing thresholds did not differ from each other. There is histological evidence of the fact that the extreme sensory and basal cells which are responsible for the 4-8 KHz hearing are more susceptible to damage than the other cells (Schuknecht, 1950; Proctor et al.
Mann et al (1990) reported that 18.18% of cases with BPPV in his study on vertigo patients had bilateral symmetrical mild sensori-neural loss and the special tests of hearing were normal in all the cases.

**Meniere’s disease**

The term Meniere’s disease refers to a group of symptoms including episodic vertigo, fluctuating sensorineural hearing loss, tinnitus, and a feeling of fullness in the affected ear. The pathologic correlate of this group of symptoms is endolymphatic hydrops. In 1861 Prosper Meniere’s first described the disease in his series of six articles in the Medical Journal of Paris.

The disease is much more common in adults with average age of onset in the forties, the symptoms beginning usually between ages 20 and 60 years. Meniere’s disease is equally common in each sex, and right and left ears are affected with fairly equal frequency (Meyerhoff et al, 1981).

In 80% of the cases only one ear is affected; in about 20% both ears are involved (Altmann, 1966). Jongkees (1971) reported frequency of bilateral disease to be as high as 60% while Cawthorne (1969) reported it to be as low as 10%. Morrison (1975) and Stahle (1976) have documented that the presence of bilateral involvement increases with the
passage of time. In a recent study, bilateral disease was
definitely seen in one in three patients, and 78% of all
patients with Meniere’s disease had a hearing loss in the
contralateral ear (Paparella & Griebie, 1984). Episodic
vertigo associated with vegetative symptoms is the most
disabling symptom (96.2 percent). In 25% of patients,
vertigo attacks lasted less than 1 hour, in 50% 1 or 2
hours, and in 25% more than 2 hours to a day or so. Hearing
loss is found in 87.7% of cases, tinnitus in 91.1% ,
intolerance of loudness in 56%, and diplacusis in 43.6%.
Aural pressure in one or both sides is related in 74.1% of
cases (Paparella, 1984 a,b ).

A peak audiometric configuration was seen in half
the patients , and a slight peak was commonly seen in the
normal ear of those with unilateral cases. Other common
audiometric patterns include low frequency losses in early
Meniere’s disease and flat losses in advanced Meniere’s
disease (Paparella, 1991). Meyerhoff (1981) reported that
the most common audiologic pattern found in a series of 211
patients (236 ears ) was a flat audiogram (41%) followed by
a peak audiogram (31%). The hearing loss may fluctuate
considerably during the course of this disease, especially
in the first year or two. If the disease remains active over
the years, fluctuation becomes less and hearing level
gradually declines. During a definitive spell, acuity is
always decreased and may remain so afterward, although
dramatic improvement may occur occasionally with the passing of a spell, especially falling spell of Tumarkin. This paradoxical improvement in hearing following an acute attack is sometimes referred to as Lermoyez’s syndrome (Mawson & Ludman, 1979).

Scores for discrimination of speech vary widely but usually fall between those seen in normal individuals & those in patients with retrocochlear disorders (Paparella, 1991). Vestibular function is frequently abnormal and in particular, the caloric test in the affected ear has been reported to be abnormal in 94% of cases (Dix and Hallpike, 1952). Measurement of vestibular hypofunction by caloric testing is the most important of all vestibular tests but more than half of the patients with Meniere’s disease have normal caloric findings even in the presence of incapaciting vestibular symptoms. (Paparella, 1991).

Hypertension

The relationship between hypertension and hearing loss is unclear and confusing due to the presence of conflicting views and contradictory reports.

Circulatory disorders, which are well documented in most parts of the human body, are not well documented in the inner ear although they are expected to occur. Although the primary site of involvement by hypertension within the cochlear or vestibular labyrinth is still debatable, it is postulated that the basic mechanism of affection of cochleo
The earliest studies were done by Bunch (1929, 1931), Hughson and Thompson (1939), and Miller and Ort (1966) but none of them found any reduced hearing in hypertensive subjects. According to Hansen (1968) a raised blood pressure per se without an involvement of central auditory pathways, does not seem to affect the hearing.

More recently Marizona and Paparella (1978) studied the auditory functions in experimentally induced hypertension in rabbits and revealed that hypertension alone does not cause progressive deterioration of auditory functions. These studies correlate and explain the result of Drettner et al (1975) who did not demonstrate any relationship between cardiovascular risk factors & hearing loss in 1000 subjects at the age of 50 years.

On the other hand, chronic as well as acute cardiovascular disease has been implicated in hearing loss in humans by various researchers including Rosen et al (1965, 1974), Spencer (1973), Cunningham and Goetzinger (1974), Rubenstein et al (1977). Rosen et al (1960) were the first to report a positive relationship between hypertension and hearing loss, based on the study amongst Mabann tribe in South East Sudan. They observed that there was a simultaneous occurrence of hypertension and hearing loss for higher tones with increasing age in healthy persons of the United States. While among the primitive Mabanns neither
blood pressure nor hearing loss increased with age. He explained this link as due to hypertension affecting the hearing organ.

Johnson et al (1972) studying the vascular changes in the human ear associated with ageing concluded that systemic vascular diseases can produce secondary microvascular changes in the cochlea and hence vulnerable to vascular problems. Fisch (1970) is also of this view that auditory system is very susceptible to vascular insufficiency.

A correlation between hypertension and hearing loss has also been demonstrated by Andriukin (1961), Jansen (1961), Andrukovich (1965), Capillini and Maroni (1974), and Jonsson and Hansson (1977).

Borg (1979, 1982) working on the hearing function of the spontaneously hypertensive rats (SHR) raised by Okamato and Akai as a suitable model for human essential hypertension found that the cochlea of this strain was more susceptible to noise than normotensive rats. He also found in the behavioral hearing test that there is a faster age related hearing loss in the SHR than in the normotensive rats. This was confirmed by Tachibena et al (1984) by electrocochleographic study in SHR and by McCormic et al (1982) by an electrophysiological technique using the cochlear microphonic as an indicator of hearing.
Alford et al. (1986) demonstrated in dogs severe auditory effects characterized by loss of VIII nerve action potential and reduction in the amplitude of the cochlear potential responses, produced by microscopic vascular disturbances. Alteration of hair cell of the organ of corti and associated atrophy of the stria vascularis was prominent in these animals indicating arteriolar obstruction to the cochlea. Mann, Sharma, Mehra, and Saha (1988) conducted a study of the effect of essential hypertension on audiovestibular functions on 40 patients with hypertension. The audiometric evaluation revealed that the hearing was within normal limits. Only 4 (10%) of the hypertensive patients had a mild sensorineural hearing loss at 4000 and 8000 Hz.

Mann, Mehra, and Rattan (1990) found that out of 116 cases of vertigo studied, 32 cases had hypertension. 7 cases revealed bilateral symmetrical sensorineural hearing loss on puretone audiometry. Out of these 7 cases, 1 case had moderate SN loss while the remaining 6 had mild loss. The audiometric pattern was suggestive of presbycusis. In all the cases special tests of hearing were within normal limits.

Various pathological processes accompanying hypertension such as chronic anoxia, acute infarction or haemorrhage may be involved in triggering a disturbance in circulation to the inner ear impairing the supply of
obligate nutrients to the peripheral vestibular end organ and/or central connections causing vertigo.

William (1965) and Naits etal (1975) have suggested a vasomotor disturbance in the inner ear circulation of patients having vertigo. Sakagami etal (1984) mentioned of the possibility of a change in blood pressure triggering disturbances in the inner ear circulation.

Sekitani etal (1964) reported normal caloric test results in 94% and normal audiological test results in 88% of the dizzy patients due to cardio-vascular disease.

Gupta (1981) in his thesis entitled 'A electronystagmographic study of the effect of hypertension on vestibular system ' found spontaneous gaze nystagmus in an overwhelming majority of hypertensives with vertigo and 40% subjects having a failure of fixation indicating a brainstem localization. In 40% of his subjects an additional unilateral weakness was seen in differential calorics suggesting an involvement of peripheral vestibular apparatus and hypertension was found to increase the maximum slow phase velocity as compared to normal.

Mann, Sharma, Mehra and Saha (1988) reported that 50% of the mild and moderate groups of hypertensive patients complained of vertigo whereas none of the cases of severe hypertension complained of vertigo. Hypertensive subjects were more sensitive to cold irrigation on either ear as compared to hot. ENG paramters of MSS, total duration and
total amplitude of nystagmus in differential caloric tests, were larger in hypertensive patients in comparison to normal thus suggesting hyperactivity of the labyrinth in the hypertensive subjects. 15% incidence of unilateral weakness in hypertensives suggests an involvement of peripheral vestibular apparatus. They further reported that there was no significant correlation between the severity of hypertension and audio vestibular dysfunction.

Mann, Mehra, and Rattan (1990) reported that majority of hypertensives described vertigo as a true rotatory sense of movement. The vestibular function tests including the Kobrak's cold caloric test were found to be normal in all 32 cases of hypertension with vertigo.

Psychogenic

Freud (1895) reported vertigo as a central symptom of anxiety neurosis. All other investigations were within normal limits. Schilder (1927) viewed vestibular dysfunction as often being the expression of two conflicting tendencies and as serving as a danger signal to the ego much like the role of anxiety in traditional analytic thinking. Hadley (1927) felt vertigo was related to self destructive tendencies. Fleming (1960) found 42% of the patients had no evidence of any organic etiology for their complaints of dizziness and vertigo. In general, no hearing loss is associated.

Alpers (1958) quoted that dizziness of neurotics
is often described as being constant, and as present both in lying down and in the erect position. Yet it is not associated with staggering, nausea or vomiting, or with cochlear symptoms.

Mann, Mehra, and Rattan (1990) reported that out of 116 cases of vertigo studied, 10 cases had psychosomatic basis for vertigo. All the cases (8 females; 2 males) had a feeling of light headedness in the beginning of attack which was followed by rotatory sensation with in the head in 3 cases, feeling of faintness in 4 cases, while in 3 cases there was a rocking sensation of the whole body. All these cases gave a positive history of stress and strain. 7 cases had anxiety neurosis while 3 cases had depression. In all the cases audio-vestibular investigations were found to be normal.

The above discussion reveals the following aspects:

1. Vertigo is recognised as a common clinical problem. Patients with vertigo challenge the physician’s diagnostic ability and the confusion and uncertainty about them are still common, since its true nature is not fully recognised.

2. Of the different clinical groups with vertigo, Meniere’s disease is invariably associated with hearing loss and in BPPV, the presence or absence of hearing loss depends on the associated pathology. Patients with cervical
spondylosis and hypertension, with vertigo usually do not show any impairment of hearing. The clinical groups also differ in the type and duration of vertigo.

3. Clinicians have a continuing interest in the psychological aspects of those suffering from vertigo. They have frequently observed peculiar personality characteristics in vertigo patients, such as aggressive dependency, emotional lability, and overreactivity. Chronic continuous vertigo may be a sign of depressive illness. Emotional factors may influence symptoms of organic origin—for example, stress may provoke bouts of Meniere’s disease as it does asthma and migraine. Perhaps because of this, several studies have attempted to establish the extent to which emotional factors are in patients with vertigo. The findings, however, are limited as well as inconclusive. As such, the role of psychological factors in patients with vertigo has been widely debated.

4. Some studies were simply case reports based only upon clinical observation. These are useful for generating hypotheses but do not represent scientific evidence.

5. Other studies did not use objective measurement techniques or did not apply appropriate statistical tests or utilize control and comparison groups. Even those using such groups failed to consider the effects of vertigo. In other words, many of these investigations compared patients
with Meniere’s disease to other otologic patients who did not have vertigo. Considering the impact of episodic unpredictable vertigo on a patient’s life, it is not surprising that, compared to non vertiginous patients, patients with Meniere’s disease appeared to have a disorder caused by emotional problems.

6. Majority of the studies have mainly examined the personality of patients with Meniere’s disease, with a consequent neglect of other types of vertigo.

7. The psychological profile of patients with vertigo as a single group have been examined with a consequent limitation of pooling different subcategories of vertigo patients. The different types of vertigo might comprise of different clinical pictures caused by different pathophysiology. As such, the examination of vertigo as a single group is not desirable. According to Afzelius (1980), there could be two different clinical pictures. One such picture should be that in patients with endogenous neurotic personalities in whom vertigo is a parallel phenomenon to nervousness. The other picture should be that in which a minor lesion, toxic, infectious, or traumatic, in integrating reticular structures causes vertigo and dizziness with parallel symptoms or possibly reactive psychic symptoms.

8. The entity known as Meniere’s disease or endolymphatic hydrops must be distinguished from all other
vestibular vertigo. A few studies made an attempt to compare Meniere’s disease with Non-Meniere’s vertigo. These studies also suffered from a methodologic flaw in the sense that different categories of non-Meniere’s vertigo were put together to form a comparison group. It is possible that in some groups in the non-Meniere’s vertigo, psychiatric disturbance play a more important role in the severity of symptoms experienced than in the other groups of Non-Meniere’s vertigo. Further study with different groups of vertigo patients seems warranted. There is an urgent need for objective investigation into the social and psychological problems of different categories of vertigo patients.

9. The incidence of depression, loneliness and passivity is on the increase even in the general population. These dimensions have not been given due consideration in the study of emotional factors underlying vertigo.

The above mentioned aspects provided the guidelines for incorporating refinements into the methodology of the present study. The psychosocial assessment might prove useful in screening patients with vertigo as well as to determine whether the psychological assessment and consultation, and the psychiatric intervention, which has been neglected till now, would be advisable/beneficial to the overall well-being of the patient and provide an adjunctive treatment for vertigo,
while at the same time taking their audio-vestibular findings also into consideration.

**Hypotheses**

The present study starts with the following hypotheses:

1. The vertigo patients will score significantly higher on different dimensions of psychological distress than normal subjects.

   This hypothesis derived its rationale from the review of related studies where psychological disturbance has been found by some investigators to be an important correlate of Meniere’s disease.

2. There will be no difference between different types of vertigo patients on different dimensions of psychological distress.

   A review of literature reveals that from the viewpoint of psychological assessment of vertigo patients only Meniere’s disease has received considerable attention from clinicians and researchers with a consequent neglect of other types of vertigo patients. The paucity of research in the context of personality assessment of different types of vertigo patients except Meniere’s disease led to the formulation of null hypothesis.

3. Vertigo patients will not differ amongst themselves and from normal subjects on demographic as well
as social characteristics.

4. It is expected that Meniere's disease and BPPV patients will differ from other groups on various audio-vestibular measures and in Cervical spondylosis, Hypertension, and Psychogenic there will be no difference on audio-vestibular dimensions.

These hypotheses concerning audio-vestibular functions derived their rationale from earlier research findings and prevalent practices.