CHAPTER - I

INTRODUCTION
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INTRODUCTION

The efforts to seek the relationship between anatomy, physiology and psychology are not new. For a long time number of philosophers and scientists have made their efforts in this field. Before 400 B.C. Hippocrates proposed that mental illnesses originate only due to physical factors (Lewis, 1941). David Hartley (1705-1757) attempted to integrate the current facts and theories of anatomy and physiology with concepts of associationistic philosophy in his Observations on man (1749). Franz Josef Gall (1758-1828) offered ‘Theory of Phrenology’ in this series. Apparently the first to use the term physiological psychology in a book title was English physician Robert Dunn (1858). The philosopher and psychologist Alexander Bain (1818-1903) sought to establish solid connections between psychology and physiological knowledge in his two books - Mental and moral science; and, Mind and body: The theories of their relation. Some other Psychologists as Kretschmer and Sheldon also tried to divide human beings into multiple categories of temperament according to their body constitution, and predicted proneness for mental illness on the basis of this division. After these efforts, there is an unlimited chain of efforts, to relate these dimensions mutually. Present study has also put a milestone in this series, by taking blood group as anatomical factor, blood pressure as physiological factor and anxiety & locus of control as psychological factor.
**Blood Groups:**

The term ‘blood group’ is used for blood cell surface antigens, and generally to red cell antigens. Genetically related red cell antigens are combined into blood group systems.

It was a revolutionary change in human immunohaematology at the turn of this century when ABO blood group system was discovered in Austria by Karl Landsteiner (1900). This discovery first made blood transfusion feasible and disclosure of the Rh antigens led to the understanding, and subsequent prevention, of hemolytic disease of the new born (HDN). Even though, blood transfusions had been attempted on many occasions during the previous two hundred years in the treatment of hemorrhage of anemia, sometimes with success, but often followed by rather sudden and unexplained death, now recognized as being due to incompatibility. By this discovery transfusion was rendered almost completely safe.

Up to 1927 the term ‘blood groups’ meant simply the ABO blood group, but few people had some idea that there could be others; one of these few was Landsteiner. Again Karl Landsteiner discovered the Rhesus or Rh blood groups in 1940, in collaboration with Alexander Weiner. Around the same period, other blood group systems were come into the light. There are now over 250 authenticated blood group antigens, many of these fall into one of 23 blood group systems. Some of them are Lewis, Duffy, Kell, Kidd, PSystem, and LSystem etc.
Among all these groups, ABO blood group system has its specific role in various physical and psychological diseases. In this system Landsteiner first introduced three type of blood groups named A, B and C (later called O). One year later the existence of a fourth less common group, AB, was came into the light. The four types were then named as A, B, AB and O. Symbol A indicates the presence of Antigen A, B the presence of Antigen B, AB the presence of both Antigens and symbol O indicates the absence of any of blood group Antigens on cells.

Antigens A and B are actually complex oligosaccharides that differ in their terminal sugar. On the red cells mostly they are glycasphinsolipid whereas in other tissue they are glycoprotein. An ‘H’ gene codes for a fructose transferase that puts a fructose on the end of these glycolipids or glycoprotein, forming the H Ag that is usually present in individuals of all individuals of all blood types.

Individuals who are type A have gene which codes for a transferase (Glycosyl transferase) that catalyses placement of a terminal N-acetylg lactosamine on ‘H’ antigen which in turn formed by addition of glucose on the end of these glycolipid or glycoprotein & the help of end fructose transferase.

On the other hand the individuals who are type B have a gene, which codes for transference that place a terminal Galactose. Whereas the individuals who are of type AB have both transferase and, the individuals who are of blood group ‘O’ have neither ‘A’ nor ‘B’ transferase. So the H Ag persist antigens & antibodies corresponding to their blood group are listed below:
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<table>
<thead>
<tr>
<th>Type Of Blood Group</th>
<th>Antigen</th>
<th>Antibodies</th>
<th>(Agglutinin) % in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>b</td>
<td>22%</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>a</td>
<td>33%</td>
</tr>
<tr>
<td>O</td>
<td>Zero</td>
<td>a, b</td>
<td>27%</td>
</tr>
<tr>
<td>AB</td>
<td>A &amp; B</td>
<td>Zero</td>
<td>18%</td>
</tr>
</tbody>
</table>

Due to their late recognition, blood groups form a comparatively small field of study, but they have an important place in genetics, immunology, and anthropology and in clinical medicine. The discovery showed its importance in psychological and medical fields also. Soon after the research the Japanese and Korean societies made a second observation – people of certain blood types often exhibited personality trait typical to that type of blood (Ishiri).

They have been important tools in forensic science also, although this role was diminished with the introduction of HLA testing and has recently been displaced by DNA ‘fingerprinting’. Beyond question, after their exposure, blood groups remained the best human genetic markers and have played a major part in the mapping of the human genome for many years.
Anxiety:

Anxiety is a complex experience consisting of both psychic and somatic manifestations and hyperarousal. In addition, behavioral reactions are frequently present as well (Heohn-Saric et al., 1995). Psychic manifestations consist of affective reactions ranging from tension to fear and, in the extreme, full-fledged panic. Cognitive aspect includes uneasiness about how to deal with situations and uncertainty about the future. It also include worry, fear, anticipation of disaster, fear of being unable to cope with circumstances, and fear of developing anxiety and, as a result, embarrassing oneself in public. Anger is related to anxiety and a decrease in the former may result in a corresponding reduction in the later (Deffenbacher et al., 1986). Transitory feelings of depression commonly occur when a person loses confidence in his or her ability to control anxiety.

Somatic manifestations of anxiety can be divided into muscular and automatic. Muscular sensations range from barely perceived tension to tremor, spasms and sometimes muscle weakness. Overall muscle tension reflects the level of central arousal (Hoehn-Saric et al., 1997).

Autonomic manifestations are common in severe anxiety but they vary in type and severity. Some individuals are constitutionally predisposed to certain autonomic responses, such as sweating or rapid heartbeat, and experience autonomic symptoms even with mild anxiety. Autonomic symptoms include palpitations, flushing, feeling of heat, perspiration, clammy hands, dryness of the
mouth, tightness in the chest, rapid breathing, shortness of breath, and butterflies in the stomach.

Hyperarousal ranges from heightened alertness to excessive vigilance and a feeling of excessive stimulation. During severe anxiety, hyperarousal causes distractibility and inability to focus attention. At night hyperarousal manifests itself in insomnia.

Behavioral manifestations of anxiety consist of flushing or palor, visible shaking, tense facial expression, strained voice, restlessness, immobilization, laughing or crying, and over talkativeness. Depending on an individual’s personality, anxiety may lead to avoidance, retreat into fantasy, dependence on others, seeking reassurance, soliciting others advise, or search for distracting activities. It also may increase suspiciousness or lead to aggressive actions (Hoehn-Saric, 1979; Hoehn-Saric & Mcleod, 1990).

Anxiety as such, is a part of the human condition. It serves as a biological warning system that is activated by danger. It may also occur following loss or may arise from intrapsychic conflict, as in conflict between inner drives and external demands or between conflicting values systems. Anxiety is a distressing emotion usually associated with bodily discomfort. In contrast to depression, this is a reaction to loss and is directed toward the future. The threat may involve danger, lack of support or what is unknown.

According to the Yerkes-Dodson law (Yerkes & Dodson, 1908), mild anxiety improves, and high anxiety worsens, performance. Highly anxiety
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individuals are vigilant and pickup information outside of their normal intentional focus. While such a strategy alerts them to potential threats from the environment, it also makes them more prone to distraction (Mathews et al., 1990). The effect of anxiety on performance depends on the complexity of a task and the degree to which a response has been learned. When over learned, responses become automatic and less affected by anxiety.

Most researchers have paid their attention on two kind of anxiety, separately – state anxiety and trait anxiety. State anxiety, includes the notion of “reactive” anxiety, an emotional state that result from a specific stimulus or encountering a new situation. Trait anxiety, namely the tendency to respond to stressors with anxiety, is at least in part, inherited. The level of trait anxiety is normally distributed in the general population.

Anxiety symptoms appear to increase the risk of hypertension, coronary artery disease, and death following myocardial infarction (Hayward et al., 1990). The reverse is also true; physical illness may precipitate, exacerbate, or worsen the course of an anxiety problem.

In a study of more than 800 older persons, Robert S. Wilson et al., (2003) found that anxiety proneness was related to morality, but this effect was mainly due to the association of anxiety with depressive symptoms.

Anxiety problems are extremely common, but often go unrecognized and untreated. In their diagnosis, a full assessment, which includes a history, physical examination and mental state, is mandatory. Except this, it is a multifactor
problem, which could not be claimed to be originated due to a single, two or three reasons. Various factors behind this as stress, education, helplessness etc. have been proved by number of previous studies, but various hidden factors are still here to be searched out. Blood group is also such a factor in this area.

**Locus of control:**

Locus of control is a personality construct with refers to a person's perceptions of the agency of control of the reinforcements he receives. A person is said to have an internal locus of control (hereafter referred to as I) if he feels that the reinforcements, which he receives, occur primarily because of his own purposeful behavior. A person is said to have an external locus of control (hereafter referred to as E) if he feels that the reinforcements, which he receives, occur primarily because of forces beyond his control. An E may attribute his lack of control to either (a) his own impotence or (b) the extraordinary strength of some external agent.

In social learning theory, locus of control is a 'generalized expectancy' that pertains to the perception of causal relationships between behaviors and reinforcing experiences. It is similar to a belief or an attitude that persons have about the effectiveness of their behavior to achieve desired outcomes. Persons, who become fatalistic, believing that they can do little to change the nature of their experiences, are said to hold generalized expectancies for external control. In
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contrast, if individuals believe that their experiences reflect their efforts, personal characteristics, and actions, they are said to have developed generalized expectancies of internal control. That is, they assume that their outcomes and experiences are at least partially shaped by their own actions. Generalized locus of control expectancies have been used to explain the different ways in which people respond to threats and challenges. A more Internal locus of control is said to characterize resilient individuals who actively deal with problems in hope of overcoming them. A more external locus of control is said to characterize lethargic persons who seem more ready to capitulate, succumbing to inactivity and dysphoria when confronting even small obstacles.

Subsequent research investigations demonstrated the utility of locus of control as predictor of the patterns, in which people cope with stress. Reviews of these researches indicated that internals often exhibited less emotional reactions to stressful events than externals, which prompted some researchers to seek out the ways in which control expectancies exerted their effects upon experience of stress. One review of pertinent research attested to a link between locus of control expectancies and coping strategies that could account for moderation of stress effects by locus of control. For example, In a study concerning responses to natural disasters, internal with businesses that had been destroyed by the flooding that accompanied hurricane hazel were found to have reestablished themselves more quickly then externals in the three and half years following the disaster. Differential rates of recovery were attributed to the grater emotionality and less
problem focused coping observed among externals in comparison to internals. Analogous findings were obtained among a sizable sample of Israeli soldiers during the 1982 war in Lebanon, indicating no recovery from traumas were more common at both two and three years after the war among externals, who had engaged in emotion-focused coping more than had internals. Likewise, among nurses in training, internals were found to have coped more actively with threatening challenges than had externals; they were more likely to have attempted rectifying situations than were deemed controllable, whereas externals most often concentrated upon their emotional responses even when facing what were judged to be controllable difficulties.

The perception of personal control is scientifically important in number of ways. It reflects the real constraints and opportunities of one’s ascribed and achieved statuses. When viewed in the aggregate across groups, it yields an imprint of structured inequality. As suggested by Hughes, Demo and Mirowsky & Ross, minority-group members such as black and Mexican Americans feel less control than do others (Hughes and Demo 1989; Mirowsky and Ross 1984, 1990). Further a low or negative sense of control represents the human awareness, that corresponds to learned helplessness a behavioral state of suppressed attention and action that induces biological stress (Gold, Goodwin and Choruses 1988; Hiroto, 1974). Throughout adult life a low sense of control produces psychological distress in the form of anxious and depressed mood (Misowsky and Ross 1989; Pearlin et al. 1981).
Blood Pressure:

Blood pressure is the head of pressure, produced by pumping action of heart by which the blood moves from heart through arteries, capillaries, veins and back to the heart.

The pumping action involves two processes in itself, the contraction of ventricle (systole) and the extension of ventricle (diastole). The average systolic pressure is found to be 120-mm. hg and diastolic blood pressure is 80-mm. hg in healthy young adults in the sitting posture. While this range of pressure increases inside the arteries; known as high blood pressure and when it decreases, known as low blood pressure.

High blood pressure exhibits itself by some common features such as giddiness, sleeplessness, weakness, headache, increase in heart rate, bleeding through the nose, inside the retina and brain, dyspnoea at night due to weakness of heart, fainting and even loss of consciousness, while low blood pressure can be diagnosed with the symptoms as tiredness, weakness, headaches, palpitations and fainting or dizziness.

The heart goes on doing its work within all of us, unnoticed most of the time. As a continuous to pump, it may meet high resistance in the arteries because they are constricted or clogged. When it dose, the heart must work harder and may become enlarged in order to meet this heavy workload. In the long run, the heart may weaken. Also, the increased tension in the arterial wall to contain the blood being pushed through at high pressure stimulates cell growth, which further
thickens the wall and thus increases resistance to the flow. A vicious circle forms that keep pushing blood pressure higher and higher. High pressure itself helps to narrow the passage where blood must flow and thus further drives the pressure up. This is why high blood pressure is such an important risk factor in heart and arterial disease. The most common complications from chronic high blood pressure are stroke and heart attack. In some cases the heart itself or the kidney may be damaged. Therefore, even without complication, high blood pressure is considered as an early phase of a hypertensive disease.

In a healthy person also, normal blood pressure fluctuates all the time to meet the changes required by the body as it goes through its daily activities. The heart-beat may be slow and regular as he sits reading and then increases in speed and force as he summons up what is needed for strenuous physical effort such as sports or hard physical labor. In the case of someone with a heart transplant such rapid atomic adjustments no longer occur because the heart no longer has nerve connections with the rest of the body. In the rest of us, these adjustments go on instantaneously but unnoticed, hour by hour, around the clock.

There are, therefore, no clear or absolute cut-off points between what is normal and what high blood pressure is. High blood pressure itself is not a disease but some degree of variation from normal, with the exception of a small number of persons whose hypertension is a symptom of glandular, renal, or other pathological conditions.
In 1999 WHO - International Society of Hypertension outlined diagnostic criteria for hypertension and provided a common basis for describing persons and comparing frequency of hypertension in different countries. These criteria have been widely accepted internationally, but it must be emphasized that the cut of point between “normal” and “high” blood pressure are always somewhat “arbitrary”.

If we observe, in comparison with low B.P., high B.P has got more attention in researches, especially in the field of its root causes and proneness to other personality variables. Researchers have got its root causes in many different ways. Initial causation divides itself naturally into genetic and environmental factors. The genetic cause is postulated to involve defective proteins in vascular smooth muscles, especially those effecting calcium and potassium transport.

Blood group is also such a genetic factor, for which researchers have tried to seek out the proneness of high blood pressure, but no concrete findings are found yet.

Keeping this investigation in view, the purpose of this study is to know the effect of blood group on anxiety, locus of control and blood pressure of no-clinical individuals. The purpose is also to investigate the effect of blood group on these variables in perspective of age and sex also. To achieve this purpose, following problem was taken.
STATEMENT OF THE PROBLEM:

To study the anxiety, locus of control and blood pressure among the males and females of different blood groups.

RATIONALE OF THE PROBLEM:

The purpose of this research was to find out the relationship among blood group, blood pressure, anxiety and locus of control. These four variables are concerning with three independent disciplines of medical science i.e. anatomy, physiology and psychology. In the beginning of psychology various ideas were proposed by philosophers and psychologists about mind and body relations. In this period the literature of psychology was enriched with the studies of same field. As the area became vaster and psychology entered in the open sky of knowledge, studies to look for the relation between mental structure and physical structure gradually avoided. Besides this, there are hardly some studies in which a relation among blood pressure, anxiety and locus of control is looked for. Keeping this view in mind, this study has done to fill the gap in the literature as well as to seek a direct relation among blood pressure, anxiety and locus of control in perspective of blood group, age and sex.

Again, an effort has made to find out the impact of blood group over blood pressure, anxiety and locus of control. If the research indicates certain important and significant impact of blood group over blood pressure, anxiety and locus of control, areas of further research would be opened. Apart from this, gaining a
better comprehension of relation among all these variables will be useful for the experts working in this area for several reasons, which include the wide-ranging and advisory knowledge of etiology, assessment and treatment of anxiety and high blood pressure. In this way many fruitful suggestions regarding the interactive relationship of these variables could be offered to the medical advisors, pathologists and physiologists and treatment of anxiety and high blood pressure may be better administered based on individual differences.

**OPERATIONAL DEFINITION OF THE KEY TERMS:**

**Independent Variables:**

**(A) Blood Group:**

The term blood group is used for blood cell surface antigens, and generally to red cell antigens. Till now about 23 blood group systems has been came into the light as ABO, MNS, P, Rh, Kell, Lewis, Duffy, Kidd and others. But the researcher emphasized only on ABO blood group system in which four blood groups were accord i.e. O⁺, A⁺, B⁺ and AB⁺. Even though, there were eight blood groups in all as O⁺, O⁻, A⁺, A⁻, B⁺, B⁻, AB⁺, AB⁻ but researcher omitted the persons having Rh- factor in their blood group, for some genuine reasons. (Mentioned in the limitation and justification of the sample; page-52).

**(B) Sex:** Sex (i.e. male and female) was studied as an independent variable.
(C) **Age**: Two age groups ranging from 25-40 (young adults) and 41-56 (old adults) were studied here to obtain the effect of age as an independent variable.

**Dependent Variables**: 

**Anxiety**: 

Anxiety is a universal and complex experience consisting of psychic, somatic and behavioral manifestations and hyperarousal. Normal anxiety prepares the individual for a protective response, but high level causes impairment and can even be disorganizing. When it becomes severe and chronic, individuals becomes neurotic and require clinical and professional support. Here the term ‘anxiety’ is used only for different ranges of anxiety from lowest to highest, which occurs in no-clinical population. It is not meant for anxiety disorders as GAD, panic attacks, PSTD or others like these.

**Locus of Control**: 

Locus of Control is a personality construct, generated within Rotter’s social learning theory (*Rotter, 1960*). It describes the degree to which an individual believes that reinforcements are contingent upon his own behavior. Internal refers to individuals who believe that reinforcements are contingent upon their own behavior, capacities or attitudes. External control refers to the individuals who
believe that reinforcements are not under their control but powerful others, luck, chance, fate etc.

**Blood Pressure:**

The movement of blood from heart through arteries, capillaries, veins and back to the heart depends on the head of pressure produced by pumping action of heart. This pressure is known as blood pressure or arterial blood pressure. The pumping action involves two processes in itself, the contraction of ventricle (systole) and the extension of ventricle (diastole). In between these processes, there is very short period of rest to the heart (pulsation).

When this range of pressure increases inside the arteries, known as high blood pressure. Persistent increases are to be considered as abnormal. In this state, we know it as hypertension. A fall in systolic blood pressure below the normal range in an adult is called low blood pressure or hypotension. In present study, researcher has focused her attention on normal blood pressure, high blood pressure and hypertension in no-clinical population.

**OBJECTIVES:**

1. To study the major and interactive effects of the following variables on anxiety, locus of control and blood pressure.
   
   (A) Blood groups (A, B, O, AB)
   
   (B) Sex (Male, Female)
(C) Age (25-40, 41-56)

2. To study relationship among the following variables.

   (A) Blood group with Anxiety/ Locus of control / Blood pressure.
   (B) Sex with Anxiety / Locus of control/ Blood Pressure.
   (C) Age with Anxiety/ Locus of control / Blood pressure.
   (D) Anxiety with Locus of control and Blood pressure.

**SPECIFIC RESEARCH QUESTIONS:**

1. Is there any major effect of blood group on anxiety/ locus of control/ blood pressure?

2. Is there any major effect of sex on anxiety/ locus of control / blood pressure of the person of different blood groups?

3. Is there any major effect of age on the anxiety / locus of control / blood pressure of the persons of different blood groups?

4. Is there any interactive effect of blood group and sex on anxiety / locus of control blood pressure?

5. Is there interactive effect of blood group and age on anxiety / locus of control / blood pressure?

6. Is there any interactive effect of blood group, sex and age on anxiety / locus of control / blood pressure?

7. Is there any interactive effect of blood group, sex and age on anxiety / locus of control/blood pressure?
8. What is the pattern of relationship between the following variables?

(i) Blood group with anxiety / locus of control / blood pressure.

(ii) Sex with anxiety / locus of control / blood pressure.

(iii) Age with anxiety / locus of control / blood pressure.

(iv) Anxiety, locus of control and blood pressure.

**HYPOTHESIS:**

1. Blood group has no significant effect on the anxiety level / locus of control / blood pressure of the person.

2. Sex has no significant effect on the anxiety level / locus of control / blood pressure of the persons of different blood groups.

3. There is no significant effect of age on the anxiety level / locus of control / blood pressure of persons of the different blood groups.

4. There is no significant effect on the interactions between the following on the anxiety level / locus of control / blood pressure.

   (i) Blood group X sex.

   (ii) Blood groups X age.

   (iii) Sex X age.

   (iv) Blood group X sex X age.

5. There is no significant relationship (positive/ negative) between following variables:

   (i) Blood group with anxiety / locus of control / Blood pressure.
(ii) Sex with anxiety / locus of control / blood pressure.

(iii) Age with anxiety / locus of control/ blood pressure.

(iv) Anxiety, locus of control and blood pressure.

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