

# Aggressive Driving Case Studies and Mitigations in India

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**Abstract-** Road rage is a phenomenon which indicates that society is on edge. Increasingly, aggression and violence has appeared to drift further into mainstream Indian society. Stories of school shootings, workplace violence, violence on the airlines, and “road rage” abound. Road rage has recently been cited as equalling alcohol-impaired driving in the number of resultant motor vehicle accident related injuries and fatalities (Martinez, 1997<sup>1</sup> and Snyder, 1997)<sup>2</sup>. The probability of becoming a victim on the roadways is significantly increased by the average exposure of the individual on the road. Presently Indian roads and driving conditions are a point of discussion moreover no comprehensive data is available to how many persons die or are injured due to road rage cases. In the last three years in the capital of India sudden provocation prompted people to kill or physically assault each other. In 2005-2006 it topped the list of murder motives. In 2007 it was the second highest cause in murder list.

This paper discusses results of opinion survey of experts as well as of the drivers/ commuters, detailed analyses of the causes and time-wise, vehicle-wise, location-wise aggressive behaviour among drivers. Paper further highlights action plan for mitigating measures for reducing aggressive behaviour among Indian drivers.

**Index Terms-** Aggression; Road Rage; Violence.

## I. INTRODUCTION

A report from the World Health Organisation and the World Bank (2004)<sup>3</sup> on road traffic accidents and injuries estimated 1.2 million people are killed in road crashes each year and as many as 50 million are injured worldwide. There is substantial body of work on risk taking behaviour (Turner et al., 2003)<sup>4</sup> socio-economic factors and driving history in relation to road traffic accidents. They reported that high incidence of motor vehicle crashes among young males was related to their risk taking behaviour. Apart from medical costs, damage to property and loss of productivity adds to the cost impact. A decade's worth of saving the Rs. 50,000 million estimated loss in traffic accidents every year could buy the country a 7,000 km-long, six-lane national highway at today's rates. That would cut back on the Rs 300,000 million India loses every year due to road-related mishaps, freeing a sea of finance for the social development sector, including disaster management. According to the World Disasters Report 1998<sup>5</sup>, "The economic cost of road accidents is equivalent to approximately one per cent of the Gross National Product." But, experts say, road disaster management does not figure in the agenda of the MOST. In 1998-99, the MOST was given Rs. 43,260 million. In the national annual budget of 1999-

2000, it was allocated Rs. 53,560 million for road safety. Experts point out that road disaster management is yet to figure in the agenda.

Presently Indian roads and driving conditions are a point of discussion moreover no comprehensive data is available to how many persons die or are injured due to road rage cases. Road deaths in India registered a sharp 6.1% rise between 2006 and 2007. However, road safety experts say the real numbers could be higher since many of these accident cases are not even reported.

In the last three years in the capital of India sudden provocation prompted people to kill or physically assault each other. In 2005-2006 it topped the list of murder motives. In 2007 it was the second highest cause in murder list. According to Delhi Police “The most chilling examples are cases of violent road rage when people hit each other due to minor fights.” Some behavioural factors were significantly associated with having been involved in an accident: tailgating, getting angry with other drivers, aggressive behaviour, encounter with the police and being warned for poor riding.

According to doctors such erratic and potentially dangerous behaviour is a medical problem which is called Intermittent Explosive Disorder (IED) which is significantly different from foul temper and it affects up to one in 20 people more men than women. Doctor Rajesh Sagar, Associate Professor, Department of Psychiatry, AIIMS says “People suffering from IED can go to extremes without understanding what they are doing. People do not realize the intensity of the problems until they commit a violent act” (Bajpai, 2008)<sup>6</sup>.

The National Highway Traffic Safety Administration (NHTSA)<sup>7</sup> distinguishes road rage from aggressive driving by classifying aggressive driving as a traffic offense and defining it as “the operation of a motor vehicle in a manner which endangers or is likely to endanger people or property” while road rage is classified as a criminal offense and is defined as “an assault with a motor vehicle or other dangerous weapon by the operator or passenger(s) of one motor vehicle on the operator or passenger(s) of another motor vehicle or vehicles precipitated by an incident which occurred on a roadway” (Martinez, 1997)<sup>1</sup>. Aggressive driving is an apparent cause which aggravates the road rage cases. The term “Road Rage” was first coined in 1988 (Fumento, 1998)<sup>8</sup> and is defined as “Violent Anger Caused by the Stress and Frustration of Driving in Heavy Traffic.” Some researchers suggest this definition is not entirely accurate. For example, road rage has been described as a cultural habit of retaliation that occurs as a result of frustration and independent of heavy traffic (James & Nahl, 1998)<sup>9</sup>. Elevated levels of anger may prompt aggressive and other risk-taking behaviour, that can increase accident risk, and risk of other deleterious behaviour

such as physical assault between drivers or argument with passengers (Deffenbacher, Oetting, & Lynch, 1994)<sup>10</sup>.

Stradling & Parker, 1997<sup>11</sup> define aggressive driving by grouping driving behaviours into three categories: lapses, errors, and violations. Lapses are exemplified by such behaviours as pulling away from the curb in third gear, or switching on one control when trying to turn on another. Errors include failure to see a sign, misjudging a distance, etc. Violations involve intent and are related to aggressive driving such as disregarding the speed limit, running a red light, or tailgating. Violations aggravates the anger and frustration among the fellow road users or drivers which turns up into personal attacks on fellow drivers such as obscene gesturing, verbal insults, throwing objects, and, in extreme cases, physical assault. Such behaviours tend to be reciprocated quickly, and a relatively minor infraction can quickly escalate into a major altercation resulting in injury, property damage, or even death (Maiuro, 1998)<sup>12</sup>.

In India, to date, there is no work published on risk taking behaviour and road rage incidence and related mitigation measures nor an objective record of driving with regard to road traffic accident. There is a need to develop an agreed conceptual framework for examining the above factors using appropriate parameters and measurable variables by systematic approach. This study attempts to provide evidence of several factors leading to road rage and how they lead to an accident. This can be used to control or modify the risk behaviours, build public health interventions like policy making on road safety measures, education and health. It might help devise methods to minimise or avoid consequences of road traffic accidents related to road rage.

### 1.1 Road Rage Incidences

Road rage stories coming from countries across the globe confirms its proliferation as a random, albeit widespread, form of potentially deadly interpersonal violence. Yet, despite its commonness, road rage presents a series of unique challenges to researchers, making it unlike most other forms of interpersonal violence. First, it usually involves expressed aggression between strangers. Second, it is related in some way to a driving incident. Third, it involves a perceived threat of "invasion" into one's space, and thus, one's identity. Fourth, it is a conflict phenomenon that has yet to secure a universally agreed upon definition. Fifth, there are, by some standards, insufficient quantifiable data documenting its existence. Sixth, theories about its causes abound, proposing an extremely broad range of

probabilities. Seventh, the inability to target causes for the phenomenon presents major challenges to resolving it.

## II. RESULTS AND INTERPRETATION OF TIME – WISE FIELD OBSERVATION OF AGGRESSIVE DRIVING CASES ON A SPECIFIED LOCATION

Field observations were carried out in three phases

- Time –wise field observation and recording of Road Rage incidences and Aggressive Driving cases
- Results and interpretation of vehicle-wise, weather-wise analysis of road rage incidences in Delhi and some NCR areas
- Administering Propensity of Aggressive Driving Rating Scale on Drivers of the selected sample.

Time –wise field observation and recording of Aggressive Driving cases were made on NH-8 (Ahram-Badarpur Road Stretch), New-Delhi team members recorded time wise various aggressive driving and road rage incidences for duration of five hours i.e. from 9:15 a.m. to 5 p.m. The main objective of selecting this NH-8 road stretch was to compare aggressive behaviour and risk taking practices of drivers on off peak hours and peak hours. Apart from these several complains were also received from road users about aggressive driving practices shown by drivers of different vehicles on this particular road stretch.

Observations were made on the basis of number of traffic violations and risk taking behaviours (as mentioned below) shown by the drivers of light motor vehicles i.e. car/jeep, three wheelers and two wheelers and heavy motor vehicle drivers:

- Number of red light jumping cases
- Number of tailgating cases
- Number of aggressive honking horn
- Number of wrong side overtaking

### 2.1. Observation of Red Light Jumping Cases

Overall 503 (whole vehicle population) number of red light jumping cases were observed out of which drivers of two wheelers & light motor vehicles were observed maximum violating traffic signals by jumping red lights (total 239,48% and total 207,41% ) as compare to the drivers of other vehicles.

**Table 2: Field Observation of Risk Taking Behaviour (Red Light Jumping Cases)**

| Red Light Jumping |          |    |       |    |        |    |         |   |
|-------------------|----------|----|-------|----|--------|----|---------|---|
| Time              | Car/Jeep | %  | T.W*. | %  | TH.W.* | %. | H.M.V*. | % |
| 9:15 -10:15 am    | 44       | 9  | 52    | 10 | 7      | 1  | 0       | 0 |
| 10:30 -11:30 am   | 38       | 8  | 42    | 8  | 10     | 2  | 3       | 1 |
| 1:30 -2:30 pm     | 32       | 6  | 37    | 7  | 6      | 1  | 6       | 1 |
| 3:00 – 4:00 pm    | 40       | 8  | 47    | 9  | 7      | 1  | 7       | 1 |
| 4:00 – 5:00 pm    | 53       | 11 | 61    | 12 | 9      | 2  | 2       | 0 |
| Total             | 207      | 41 | 239   | 48 | 39     | 8  | 18      | 4 |

\*T.W. =Two –Wheelers, TH.W. =Three-Wheelers, H.M.V. =Heavy Motor Vehicles

Maximum numbers of red light jumping cases were observed during the evening peak hours i.e. between 4.00-5.00 pm while minimum numbers of such cases were observed during afternoon i.e. between 1.30-2:30 p.m. (table-2).

**2.2 Observation of Behaviour of Tailgating**

During the period of 9:15 a.m. to 5:00 p.m. total 52 cases of tailgating were observed .One of the interesting observation was the drivers who were high speeding e.g. car/jeep and two wheelers drivers they minimum tailgated as their tendency were to jump red light, high speeding and overtaking the front vehicles.

In such cases out of the total 52 tailgating cases only 4% car/jeep drivers and none of the two wheeler drivers tailgated during this time interval. Comparatively slow moving three wheelers drivers (85%) and heavy motor vehicle drivers (12%) were observed tailgating other vehicle maintaining minimum space with the front vehicle. Also the maximum numbers of tailgating cases were observed during the peak hours between 1:30 p.m. -2:30 p.m. while minimum numbers of cases were observed during evening peak hours between 3:00 p.m. -4.00 p.m. (table-3).

**Table 3: Field Observation of Risk Taking Behaviour (Tailgating)**

| Tailgating      |          |   |      |   |          |    |        |    |
|-----------------|----------|---|------|---|----------|----|--------|----|
| Time            | Car/Jeep | % | T.W. | % | THREE W. | %  | H.M.V. | %  |
| 9:15 -10:15 am  | 0        | 0 | 0    | 0 | 10       | 19 | 1      | 2  |
| 10:30 -11:30 am | 1        | 2 | 0    | 0 | 10       | 19 | 2      | 4  |
| 1:30 -2:30 pm   | 1        | 2 | 0    | 0 | 11       | 21 | 3      | 6  |
| 3:00 – 4:00 pm  | 0        | 0 | 0    | 0 | 5        | 10 | 0      | 0  |
| 4:00 – 5:00 pm  | 0        | 0 | 0    | 0 | 8        | 15 | 0      | 0  |
| Total           | 2        | 4 | 0    | 0 | 44       | 85 | 6      | 12 |

**2.3 Observation of Behaviour of Aggressive Honking Horn**

Overall 107 vehicles were observed aggressively honking horns out of which drivers of heavy motor vehicles were

found observed maximum honking aggressive horns as 37% of the total vehicle population followed by drivers of two vehicles and car/jeep as 30% and 26%.

**Table 4: Field Observation of Risk Taking Behaviour (Honking Horn Cases)**

| Aggressive Honking horn |          |    |      |    |          |    |        |    |
|-------------------------|----------|----|------|----|----------|----|--------|----|
| Time                    | Car/Jeep | %  | T.W. | %  | THREE W. | %  | H.M.V. | %  |
| 9:15 -10:15 am          | 3        | 3  | 6    | 6  | 1        | 1  | 7      | 7  |
| 10:30 -11:30 am         | 6        | 6  | 6    | 6  | 2        | 2  | 5      | 5  |
| 1:30 -2:30 pm           | 4        | 4  | 2    | 2  | 2        | 2  | 8      | 7  |
| 3:00 – 4:00 pm          | 4        | 4  | 9    | 8  | 2        | 2  | 7      | 7  |
| 4:00 – 5:00 pm          | 9        | 8  | 7    | 7  | 4        | 4  | 13     | 12 |
| Total                   | 26       | 24 | 30   | 28 | 11       | 10 | 40     | 37 |

Maximum number cases related to aggressive honking horn were observed during the evening peak hours between 4:00-5:00 p.m. while minimum numbers of cases were observed between 1:30-2:30 p.m.

Wrong side overtaking were maximum observed in two wheelers i.e. 43% followed by drivers of car/jeep i.e. 23% .It is interesting to observe that high speeding drivers i.e. two – wheeler riders and car/jeep drivers were found maximum overtaking from wrong side.

**2.4 Observation of Behaviour of Wrong side overtaking**

**Table 5: Field Observation of Wrong side overtaking**

| Wrong side overtaking |          |   |      |    |          |   |        |   |
|-----------------------|----------|---|------|----|----------|---|--------|---|
| Time                  | Car/Jeep | % | T.W. | %  | THREE W. | % | H.M.V. | % |
| 9:15 -10:15 am        | 7        | 9 | 7    | 9  | 1        | 1 | 3      | 4 |
| 10:30 -11:30 am       | 3        | 4 | 3    | 4  | 2        | 3 | 1      | 1 |
| 1:30 -2:30 pm         | 4        | 5 | 10   | 13 | 1        | 1 | 4      | 5 |
| 3.00 - 4.00 pm        | 7        | 9 | 2    | 3  | 2        | 3 | 3      | 4 |

|                |    |    |    |    |   |   |    |    |
|----------------|----|----|----|----|---|---|----|----|
| 4.00 - 5.00 pm | 2  | 3  | 12 | 15 | 1 | 1 | 4  | 5  |
| Total          | 23 | 29 | 34 | 43 | 7 | 9 | 15 | 19 |

Three wheelers were found minimum overtaking (9%) from wrong side as compared to other vehicles. Maximum numbers of cases were observed during were observed during between 1:30- 2:30 p.m. and 4 p.m. -5p.m and minimum cases were observed between 10:30 a.m. to 11:30 a.m.

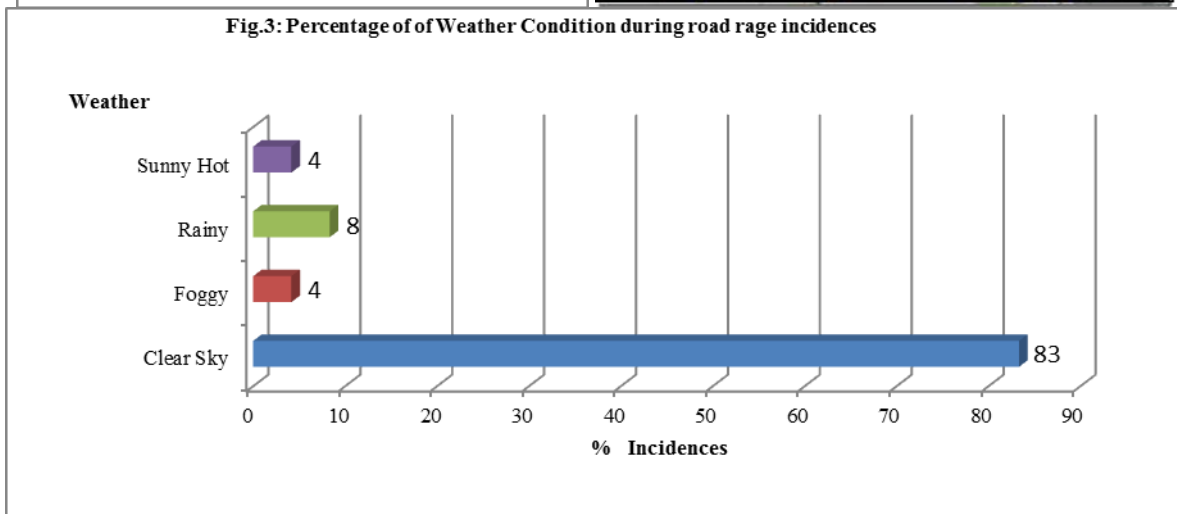
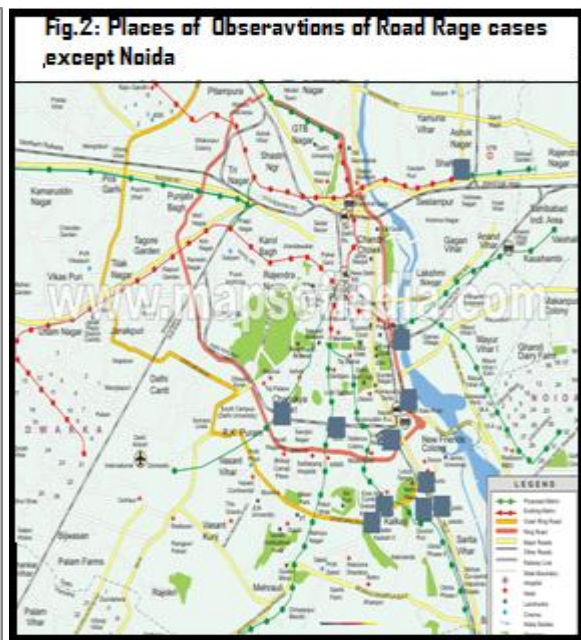
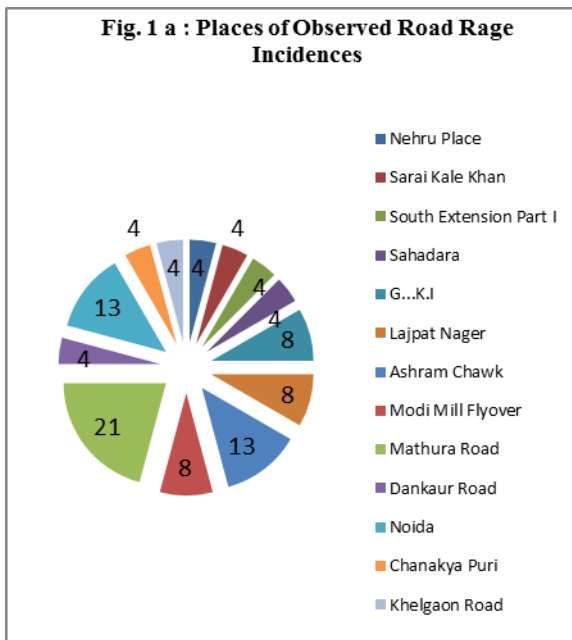
### III. RESULTS AND INTERPRETATION OF VEHICLE-WISE, WEATHER-WISE ANALYSIS OF ROAD RAGE INCIDENCES

Field surveys related to the observation of various road rage incidences were carried out by the research team (which was comprised of police personnel and scientists from the Central Road Research Institute) on Delhi roads for eight months i.e. from October 2008 to May 2009. Out of the total 100 incidences,

24 major cases where some types of physical assaults or aggressive gestures / postures were involved by the aggressive drivers (which are highlighted below) were analysed.

#### 3.1 Road Capacity and Enforcement and Perception of Weather Condition

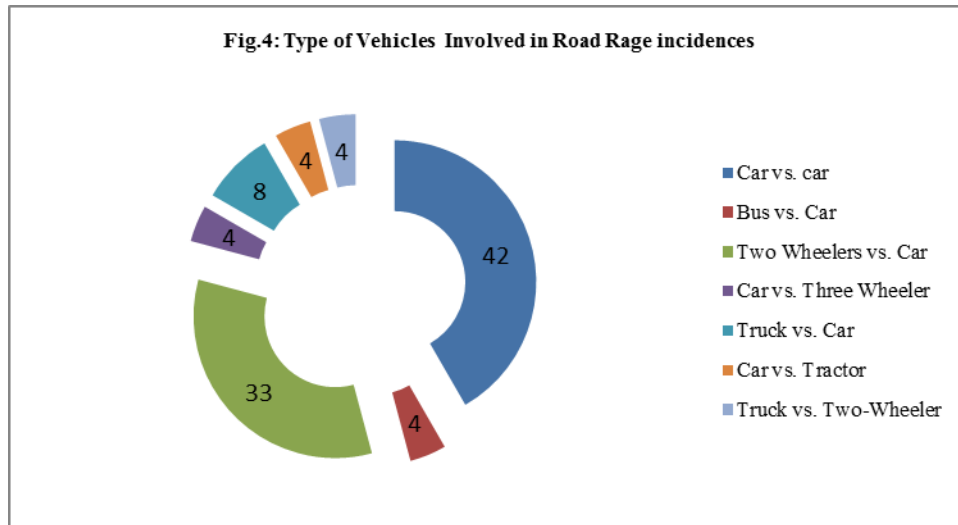
Places of observations and number of incidences occurred at different place of Delhi and NCR areas are shown below (fig.1,2). This has been observed that those areas where more road rage incidences have been observed, had either lack of proper road capacity leading traffic congestion, lack of working traffic signals or presence of enforcement. Apparently, as observed in the survey weather condition was clear which depicts that road rage incidences are not always related to weather conditions except few exceptional cases (fig.3).



### 3.2 Type of Vehicles Involved in Road Rage incidences

During observation it was found that 42% car drivers were involved with fellow car drivers, while car drivers were either involved with two wheelers 33%, 4% with tractors and 4%

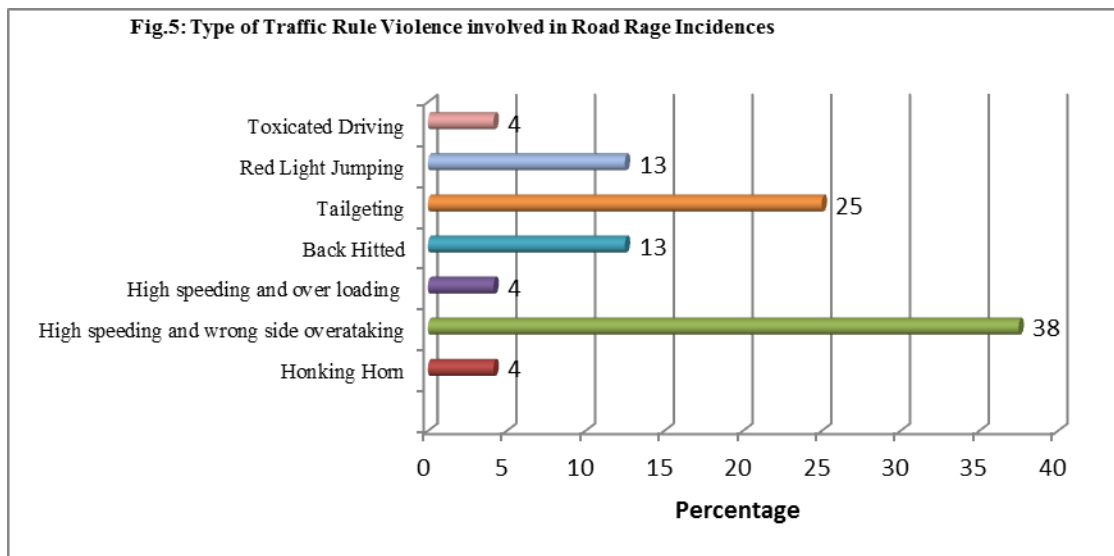
with buses, 4% with three wheelers and 8% with trucks. This shows that car drivers were maximum involved in all types of road rage cases (fig4).



### 3.3 Type of Traffic Rule Violence involved During Road Rage Incidences

Road rage is just a trigger which brings forth all frustrations deposited inside the human mind for any minor incidence which may be any form of violation of traffic rules from either of the parties i.e. victims or aggressor, resulting into physical harm, fatalities and mental assaults. From the survey it was observed that 38% road rage incidences were triggered due

to high speeding accompanied with wrong inside overtaking and 25% due to tailgating by any of the parties (victim or aggressor). Other types of violence involved during road rage incidences were red light jumping 13%, hitting from the back 13%, high speeding with overloaded vehicle 4%, aggressive honking horn 4% and driving under influence of alcohol 4% (fig.5).



## IV. ANALYSIS OF PADS SCALE ACROSS DIFFERENT AGE GROUPS, PROFESSIONAL GROUPS, GENDER AND DRIVING EXPOSURES

### 4.1 Brief Introduction of the Propensity of Aggressive Driving Scale (PADS)

This scale was developed by Jason P. De Pasquale, E. Scott Geller, Steven W. Clarke and Lawrence C. Littleton in

1999. This scale is designed to identify individuals with the greatest tendency to become angry while driving and subsequently engage in hostile driving behaviours or acts of "road rage." Investigation revealed that the PADS is having adequate test-retest reliability (.91) and validity.

**4.2 Sample Size and characteristics:**

In the present study 191 drivers from Delhi were randomly selected across different age groups, professions, qualification and driving experiences. In the present sample population 81% were males and 19% were females, age –wise categorisation shows that 3% were from below 18 years 36% were from 19 - 25 years, 30% were from 26-35 years, 15% were from 36-45 years, 9% were from 46-55, 7% were 56 & above. Qualification wise categorisation of sample consisted of 36% graduates, 30% post graduates, 14% and 17% were qualified up to higher secondary and secondary level and 3% were only qualified up to primary level. According to the driving experiences 49% were having up to 5 years, 26% were having 5-10 years, 11% were having 10-15 years, 7% were having 15-20 years and 7% were having more than 20 years of driving experience. Profession wise in the present sample 21% were students, 3% were engineers, 8% were business men, 57% were service men, 1% and 10% were housewives and from other types of profession .

**4.3. Methodology and Data Collection:**

This study was conducted on drivers randomly across age group, qualification, profession and driving exposures with the help of experienced traffic police personnel. Various aggressive driving behaviour parameters were measured by the administration of propensity of aggressive driving scale (PADS). Following steps were adopted in the present study:

- Interview with the Additional CP Licensing, Delhi regarding opinion about road rage
- Data collection by administering PAD Scale on drivers
- Data compilation and analysis
- Report writing
- Planning and Implementation of Mitigation measures

**4.4 Interview with the Additional CP Licensing, Delhi Regarding Road Rage**

Additional Commissioner of Police expressed her opinion in an interview which was conducted by the research team that road rage is a phenomenon which shows that the society is on an edge; moreover it is a symptom of social fragmentation where one person is not able to appreciate and adjust with the problems of another. Road rage is a momentary insanity arising out of irrational anger, which is due to the emotional load of frustration which an individual is carrying. The

point at which the Road Rage occurs is just a trigger, which brings forth the accumulated tensions, pressures and frustrations in the mind of an individual to the forefront. It could be because of any specific reason e.g. a child wasting his time during examination, anger at unfair treatment etc. Anger is on the other hand may or may not be a result of bottling up of various frustrations. As for the mitigation of road rage she expressed that we all need to cultivate a sense of balance about everything. Frustration results when expectations are too high then one gets carried away by the image of “success in life”. We tend to get swayed by them and then we try to assess our achievements against this extremely subjective benchmarks set by ourselves for ourselves. She added that happiness and contentment is a state of mind and this realisation comes only through introspection. We need to teach ourselves to introspect.

**4.5 Data collection by administering PAD Scale on drivers**

This study was conducted on drivers randomly across age group, qualification, profession and driving exposures with the help of experienced traffic police personnel. Various aggressive driving behaviour parameters were measured by the administration of propensity of aggressive driving scale (PADS). Due to time and manpower constraint the observation area surrounding Delhi and NCR was kept limited.

**4.6 Analysis and Interpretation of Data of PAD Scale**

Various levels of aggressiveness were analysed on the basis of six major independent variables i.e. age, gender, profession, driving experiences and qualification taken up in the study.

**4.6.1 Level of Aggression Shown By the Respondents of Different Age Group**

Overall responses of the respondents in all situations of PADS scale were compiled and analysed to observe the age-wise effect of aggression over different situations. On the basis of the data overall maximum aggressive responses were shown by the respondents of 19 to 25 years age group who has shown 12.9% extreme aggressive responses, 23.7% aggressive responses followed by the below 18 years age groups whose parents had provided them their vehicles to drive and some respondents were having motorbikes. These age groups were observed as most vulnerable groups for involving in road rage cases resulting to fatalities and accidents.

**Table 6: Level of Aggressiveness Shown By the Respondents of Different Age Groups**

| Age of the respondents | No Aggression | Somewhat Aggression | Aggression | Extreme Aggression |
|------------------------|---------------|---------------------|------------|--------------------|
| Below 18               | 52.6          | 23.1                | 16.8       | 7.5                |
| 19-25                  | 38.2          | 25.2                | 23.7       | 12.9               |
| 26-35                  | 60.7          | 19.7                | 15.4       | 4.2                |
| 36-45                  | 54.9          | 20.1                | 17         | 8                  |
| 46-55                  | 56.1          | 30.8                | 11.5       | 1.6                |

|            |      |      |     |     |
|------------|------|------|-----|-----|
| 56 & above | 63.2 | 22.9 | 9.8 | 4.1 |
|------------|------|------|-----|-----|

**4.6.2 Level of Aggression Shown By the Respondents of Different Gender**

Female drivers showed more aggression as compared to the male drivers as female drivers have shown 10.2 percent

extreme aggression level as opposed to 6.4 percent of male drivers.

**Table 7: Level of Aggressiveness Shown By the Respondents of Different Gender Groups**

| Gender | No Aggression | Somewhat Aggression | Aggression | Extreme Aggression |
|--------|---------------|---------------------|------------|--------------------|
| Male   | 55.7          | 24                  | 13.8       | 6.4                |
| Female | 47.3          | 24.6                | 17.7       | 10.2               |

As with most human behaviour, there is a stated and unstated, a conscious and unconscious motivation for most traffic disputes. Today aggressor could be male or female, young (usually), or old, educated or uneducated, rich or poor. Violent traffic disputes are rarely the result of a single incident but the cumulative result of a series of stressors.

**4.6.3 Level of Aggression Shown By the Respondents of Different Qualification**

Overall, there was no significant difference up to .05 level in ANOVA has been found as drivers qualified up to post graduate levels were found showing maximum aggressive responses followed by drivers qualified up to primary and secondary levels.

**Table 8: Level of Aggressiveness Shown By the Respondents of Different Qualification**

| Qualification    | No Aggression | Somewhat Aggression | Aggression | Extreme Aggression |
|------------------|---------------|---------------------|------------|--------------------|
| Primary          | 34.2          | 32.8                | 21.2       | 11.8               |
| Secondary        | 31.5          | 31.7                | 26.3       | 10.5               |
| Higher Secondary | 68.4          | 19.5                | 9.4        | 2.7                |
| Senior Secondary | 58.2          | 23.5                | 12.5       | 5.8                |
| Graduate         | 50.3          | 24.6                | 16.2       | 8.9                |
| Post Graduate    | 40.6          | 25.6                | 16         | 17.8               |

**4.6.4. Level of Aggression Shown By the Respondents of Different Profession**

Respondents of category one i.e. students have shown maximum aggression level while the other groups has almost

same level of aggressiveness. This observation of research data shows that the drivers of having new driving experiences have maximum chances for involving in road rage incidences as compared to the other professional categories.

**Table 9: Level of Aggressiveness Shown By the Respondents of Different Profession**

| Profession  | No Aggression | Somewhat Aggression | Aggression | Extreme Aggression |
|-------------|---------------|---------------------|------------|--------------------|
| Student     | 40.6          | 25.7                | 20.8       | 12.9               |
| Engineer    | 50            | 23.6                | 18.4       | 8                  |
| Businessman | 64.5          | 19.6                | 11.5       | 4.4                |
| Serviceman  | 57.6          | 24.8                | 11.9       | 5.7                |
| Housewife   | 42.1          | 21                  | 31.5       | 5.4                |
| Others      | 58.1          | 20.7                | 14.4       | 6.8                |

#### 4.6.5. Level of Aggression Shown By the Respondents of Different Driving Experiences

Almost similar results have been observed in the data analysis according to driving experiences .Respondents of category one i.e. the drivers having driving experiences up to 5

years have shown maximum aggression level while the other groups has almost same level of aggressiveness. This observation of research data proves that the novice drivers have maximum chances for involving in road rage incidences.

**Table 10: Level of Aggressiveness Shown By the Respondents of Different Driving Experiences**

| Driving Experiences | No Aggression | Somewhat Aggression | Aggression | Extreme Aggression |
|---------------------|---------------|---------------------|------------|--------------------|
| Upto 5              | 48.1          | 24                  | 17.9       | 10                 |
| 5 to 10             | 58.2          | 23.5                | 13         | 5.3                |
| 10 to 15            | 61.3          | 23.7                | 10.9       | 4.1                |
| 15 to 20            | 63.1          | 20.5                | 10.7       | 5.7                |
| Above 20            | 58.5          | 28.9                | 8.6        | 4                  |

#### V. CONCLUSION OF THE RESEARCH FINDINGS

Overall, in all types of road rage cases there are some common characteristics

- It usually involves expressed aggression between strangers.
- It is related in some way to a driving incident.
- It involves a perceived threat of "invasion" into one's space, and thus, one's identity.
- It is a conflict phenomenon that has yet to secure a universally agreed upon definition.
- There are, by some standards, insufficient quantifiable data documenting its existence.
- Theories about its causes abound, proposing an extremely broad range of probabilities.
- The inability to target causes for the phenomenon presents major challenges to resolving it.

The table 11 reveals that somewhat aggressiveness was shown by the 35.1% respondents when driver of another vehicle came suddenly in front of the respondent's vehicle and the respondents had to put an emergency brake. Extreme aggressiveness was shown by 68.6% respondents when a fellow

driver occupied their parking space in a fully congested parking lot. Somewhat aggressiveness had been shown by the 36.6% respondents towards those drivers who had the general tendency to play music at high volume while driving. About 39% respondents had shown aggressiveness towards those drivers who had the general tendency of frequently switching over lanes and preventing fellow drivers from passing efficiently. Respondents had shown aggressive attitudes towards risk taking pedestrians who runs across the road ,don't use zebra crossings and come in front of the busy traffic and bump with them, about 34% of the respondents had come across with such type of situation.

Some drivers have the bad habits of eating and drinking on the road side and throwing the waste paper, bottles and other things out of their windows while driving. 96.4% drivers had come across with such type of incidences where the waste paper, bottles etc. thrown out by the drivers whom they were following and these got struck on their windshields. Facing such situations 4.2% respondents responded extreme aggressively which led to following of the faulty driver's vehicle and fighting with him, 39.3% respondents gave bad gestures to the faulty drivers and shouted towards the faulty drivers.

**Table 11: Analysis of Aggression Levels on Nineteen Different Situations**

| Behaviour                     | S1*  | S2   | S3   | S4   | S5   | S6   | S7   | S8   | S9   | S10  |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|
| No aggressive behaviour       | 47.1 | 55.5 | 0    | 68.6 | 70.7 | 38.2 | 81.7 | 89.5 | 78.5 | 56.5 |
| Somewhat aggressive behaviour | 35.1 | 24.6 | 14.7 | 25.7 | 0    | 36.6 | 5.8  | 0    | 13.1 | 4.2  |
| Aggressive behaviour          | 10.5 | 0    | 16.8 | 0    | 18.8 | 11   | 12.6 | 10.5 | 8.4  | 39.3 |



|                               |            |            |            |            |            |            |            |            |            |            |
|-------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Extreme aggressive behaviour  | 7.3        | 19.9       | 68.6       | 5.8        | 10.5       | 14.1       | 0          | 0          | 0          | 0          |
| <b>Total</b>                  | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> |
| <b>Behaviour</b>              | <b>S11</b> | <b>S12</b> | <b>S13</b> | <b>S14</b> | <b>S15</b> | <b>S16</b> | <b>S17</b> | <b>S18</b> | <b>S19</b> |            |
| No aggressive behaviour       | 66         | 52.3       | 3.1        | 3.6        | 3.1        | 75.9       | 96.9       | 53.4       | 30.9       |            |
| Somewhat aggressive behaviour | 34         | 21.5       | 28.8       | 52.9       | 67.5       | 0          | 0          | 18.3       | 53.4       |            |
| Aggressive behaviour          | 0          | 16.2       | 57.1       | 39.3       | 16.8       | 0          | 3.1        | 17.3       | 15.7       |            |
| Extreme aggressive behaviour  | 0          | 9.9        | 11         | 4.2        | 12.6       | 24.1       | 0          | 11         | 0          |            |
| <b>Total</b>                  | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> | <b>100</b> |

\*S1 to S19=situation 1 to situation 19

Respondents had also found victimised by the fellow drivers like blocking their space, bad gestures etc. for which 46.6% respondents responded aggressively (varying from somewhat 18.3% to extreme aggressiveness 11%) towards the aggressors. Generally drivers in India driver at night with high beams which in case directly fall on the eyes of the drivers produce glare effect and cause temporary impairment of vision due to the bleaching effect of Rods. About 69% respondents responded aggressively towards the drivers who were driving with high beam at night time.

## VI. THE MITIGATIONS MEASURES INITIATED BY CSIR- CRR I

### 6.1 Through Education and Enforcement

a) Research team has planned to develop an educational film on ROAD RAGE to highlight the causes and ways to control road rage.

b) Working with the Enforcement people CRR I research team working as a coordinator to talk road rage victims, help in various research activities to find effective interventions of aggressive driving and road rage. Enforcement efforts have been accompanied by public information campaigns. CRR I Cooperative programs with Delhi police in various aspects were found to be effective. To understand the mechanisms underlying young drivers' risk-taking behaviour in CRR I participated in Road Safety and Anti Aggression campaign. The goal such campaign was to bring about a change in the students and social climate so that normative behaviour of children is constructive. Various schools participated in the campaign.

c) **CRR I participated in the First Aggression Management Workshop** organized by the Delhi Police under chairmanship of Additional Commissioner of Police, Licensing Branch of Delhi Police on 15<sup>th</sup> and 17<sup>th</sup> April, 2009 in which **CRR I participated as one of the coordinator of the core group along with the other highly expertise persons.**

d) In the workshop NAVCHENTA website [www.navchetna.com](http://www.navchetna.com) was launched. The prior objective of launching such website was to inculcating safety attitude and non aggressive behaviour among youngsters through different processes e.g. CRR I research team is interacting with the different experts for solving kids problems & helping in research for identifying causes and mitigation of aggressive behaviour through this network.

### 6.2 Behaviour Scanning And Modification Through Aggression Management Workshop

CRR I participated in aggression management workshop organized in Lady Irwin College by TrafficZam.com, website [www.trafficzam.com](http://www.trafficzam.com) for imparting aggression management practices on the road. CRR I highlighted various causes of road rage incidences and highlighted to avoid such conditions through safe and calm attitude. CRR I also provided practical simulation practices among the students to show the after effect of road rage and stress on human health.

This type of intervention is useful for those drivers who do not have any record of long time driving offences. Students and young drivers were taught to control the Level of frustration and how to Avoid Becoming a Victim of road rage by

- Reducing Stress and Fatigue on the Road
- Regular maintenance of the Car
- Taking journeys in easy stages
- Acquiring knowledge about road signs and road rules
- Knowledge regarding First Aid
- 

### 6.3 Research Initiative Taken And Planned For Further Mitigating Road Rage

CRR I had also planned for a collaborative project work on indentifying aggressive attitude among college students riding

two –wheelers with Dept of Mental Health & Social Psychology,

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