



REVIEW ARTICLE

BLOOD DOPING AND GENE DOPING: A REVIEW ON RECENT TRENDS IN DOPING

Kalyani Tibe, *Akshata Dabholkar and Deepika Bhandari

Institute of Forensic Science, 15, Madame Cama Road, Fort, Mumbai- 400032, India

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ABSTRACT

The word "Doping" implies to the use of prohibited substances and practices for improving sporting performance of athletes. It includes the misuse of certain techniques and substances for enhancing the performance and endurance level of the athlete. The desire to win, acclamation and associated benefits; drives the athletes towards doping. Athletes in the present age are abusing new substances and methods of doping that are difficult to detect. Blood Doping and Gene doping are the new found trends that pose analytical challenges. Blood doping or induced erythrocythemia helps increasing ones RBC mass to transport more oxygen to muscles for better performance. Gene Doping method uses genes that have the capacity to enhance athletic performance. Analyses of these methods pose limitations due to which these doping methods are trending. This work aims at understanding some recent trends in doping related to prohibited method 'M1' i.e. Manipulation of blood and blood components; and method 'M3' i.e. Gene doping, as stated in 'The 2017 Prohibited List International Standard' by the World Anti-Doping Code; thereby suggesting the best analytical techniques used for the same.

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INTRODUCTION

1. Defining Doping and understanding its reasons

"Doping" denotes the use of substances and techniques that are banned by sports workers, primarily athletes, in order to improve their stamina and performance by increasing red blood cells mass, thereby allowing the body to transport more Oxygen to muscles. There is no legal definition of "Doping" thus this offence is defined by the international sports organizations in their own individual manner causing a variation^[45]. International Olympic Committee (IOC) defines doping as 'the use of any substance, foreign to the body, and taken with the sole intention of increasing, in an unfair manner, his/ her performance in competition'. Article 1 of WADA (World Anti-Doping Agency) Code defines Doping as 'the occurrence of one or more of anti-doping rule violations set forth in Article 2.1 through Article 2.10 of the Code'^[33]. The word *doping* became a part of the English language by 1933^[40]. The World Anti-Doping Code also defines doping as 'possession, administration or attempted administration of prohibited substances or methods, trafficking or attempted trafficking in any prohibited substance or methods'. It is the desire to win in order to gain appraisal and related benefits that drives the athletes to abuse these substances and methods^[42].

This goal is often achieved by increasing strength or overcoming fatigue with the help of performance-enhancing drugs^[50]. It is surprising to know that ancient Olympics in Greece were filled with cases of corruption and doping to such an extent that the games had to be suspended^[42]. Since the late 1960s, blood doping, the reinfusion of an athlete's own concentrated oxygenated red blood cells or those of a matched donor, shortly before competition, was alleged to have been used by European runners, cyclists, cross-country skiers and biathletes^[50]. Cyclist Lance Armstrong; the Seven-time winner Tour De France 1999 champion was consistently accused of blood doping and had won all the seven matches by cheating. Armstrong was also stripped of the seven Tour de France titles he won from 1999 to 2000.

Blood Doping

Defining Blood Doping

Blood doping also called as induced erythrocythemia, blood boosting or even blood packing. WADA defines it as "the misuse of certain techniques or/and substances to increase one's red blood cells, allowing the body to transport more O₂ to muscles to increase stamina and performance". In aerobic sports disciplines, such as long- distance running, cycling or cross-country skiing, the main factors determining performances are a high delivery of O₂ to the exercising skeletal muscles and its use^[27]. 'The 2017 Prohibited List'

*Corresponding author: Akshata Dabholkar,
Institute of Forensic Science, 15, Madame Cama Road, Fort, Mumbai- 400032,
India.

given by 'The World Anti-Doping Code' includes Blood Doping under Prohibited Method M₁ i.e. The Manipulation of Blood and Blood Components.

According to this method the following are prohibited:

1. The administration or putting back any quantity of autologous, homologous or heterologous blood, or red blood cell products of any origin into the circulatory system.
2. Enhancing the uptake, transport or delivery of oxygen artificially.
3. Any form of intravascular treatment of the blood or its components by physical or chemical means^[33].

The International Olympic Committee (IOC) officially banned blood doping after the 1984 Olympics. In the same year, the USA Olympic Committee declared that seven out of 24 cyclists of the national team who participated in the Olympic Games, used transfusions^[32].

Methods and Techniques of Blood Doping

There are two basic techniques of blood doping; heterologous and autologous blood doping:

Heterologous Blood Doping

In heterologous blood doping, the blood of matched donor is transfused in athlete's body. Though this method is widely used for therapeutic uses, it can pose harm to the athlete's body if the blood is infected.

Autologous Blood Doping

The Autologous blood doping involves removing two units of the athlete's blood, storing the blood and then reinfusing it about seven days prior to the athletic contest. Venesection needs to be performed at least three weeks before reinfusion to allow the subject's hemoglobin to recover to normal levels. Autologous blood doping is difficult to detect. Another method of doping is conventional blood bank method in which whole blood is citrated and refrigerated at 4°C without addition of preservatives and anti-coagulants, therefore the blood deteriorates steadily and its viscosity increases with increasing brittleness of red blood cells. High glycerol freezing technique is used routinely used for autologous blood transfusion where patient is facing major blood operation and only wish to receive their blood. The blood is centrifuged and glycerol added to the high concentration of red cells which are then frozen at -80°C in liquid nitrogen. At the time of infusion, cells are washed in order to increase their osmolality to remove glycerol and re-suspended in normal saline and re-infused in a suspension with hematocrit of approximately 50%^[28].

Altitude Training Simulations

Other legal ways to increase the number of red blood cells includes simulation of altitude training^[43]. During athlete's acclimatization to altitude, his maximum exercise capacity is reduced. To overcome this problem, many athletes were taken to altitude in the weeks prior to the competition. Athletes who reside at sea level are at a disadvantage when competing in endurance events at altitude^[18]. This includes using a sleep chamber for 6 to 8 hours/ per day for 2 to 3 weeks, produces

substantial increases in serum EPO, reticulocyte count and up to 23% RBC mass leading to improvement in post-altitude endurance performance. An alternative technique to simulate altitude is breathing hypoxic, normobaric gas^[32] that pushes the packed cell volume (PCV) to release natural EPO and blood cells, so that more oxygen is absorbed with every breath^[43].

Effects of Blood Doping

Erythropoiesis is part of the large process of haematopoiesis, which involves the production of mature cells found in the blood and lymphoid organs^[41]. This gives rise to improved vascularization of the muscle resulting in greater oxygen mining from the blood; helping the athlete uptake very high levels of oxygen for sustained periods of endurance work. Blood doping could be ergogenic through its effect on oxygen carriage, blood volume and cardiac output by producing a Polycythemia. Increase in plasma volume allows a greater blood flow to the skin for dissipation of heat. In many forms of endurance exercise, particularly in hot conditions, a significant part of the cardiac output is involved in heat dissipation with blood being shunted through the superficial layers of the skin. Transfusion of 450 ml whole blood on 4 consecutive days decreases submaximal exercise heart rate (in hypoxia) for several weeks, thereby predicting that exercise performance would be increased^[27]. The adverse effects of blood doping are increased transfer of infectious disease such as AIDS and hepatitis, if heterologous transfusion is used; it carries risk of intravenous infections such as venous thrombosis, phlebitis and septicaemia. For climbing Mount Everest without supplemental oxygen, a high haematocrit up to 60% would be needed. As the level of hematocrit increases, it increases viscosity of blood. Hyper viscosity associated with high haematocrit levels increases the risk of thrombotic events such as stroke and myocardial infarction. Evidences suggest that, EPO was a key suspect in many deaths^[13].

Detection methods

Blood doping virtually disappeared with the arrival of RhEPO in the market at the end of the 1980s. But due to unavailability of detecting methods blood doping has been back in practice^[41]. The essential characteristic of any anti doping strategy is the ability to sanction an athlete based identification of a banned substance by subjecting to random, unannounced testing during the weeks before event^[9].

Hematologic Passport

Hematologic passport is based on the sequential evaluation of some hematological and biochemical parameters^[33]. Erythropoietic substances and RBC parameters are affected by blood doping due to the relationship between Hb mass and physical performance in aerobic sport disciplines for determining high delivery of O₂ to the exercising skeletal muscles^[28]. For detection of autologous (self) transfusion, current hematology values for each athlete are compared with past values^[1]. Michael Ashenden had proposed that on observing significant deviations from the expected value in progressive logs of each athlete's PCV and hormone concentrations, the athlete should require follow up testing. The Italian Cycling Federation decided in 2000 that all juniors would be tested to provide a baseline PCV and given a

“Hematologic Passport” which helped them to overcome the detection problems of re-transfused autologous blood [44].

Flow Cytometry

Nelson *et al.*, (2004) suggested the use of blood group antisera to identify mixed RBC populations in blood samples by flow cytometry [28] as it allows detection of even a single unit of blood transfused, provided that there is at least one antigen mismatch between donor and recipient [33]. A test for detection of allogeneic blood transfusion doping involves blood group antisera to identify mixed RBC populations in blood samples by flow cytometry [46]. Identification of the survival of transfused RBCs in patients by flow cytometry can be determined by capturing its FSC (Forward Scatter Cytometry), SSC (Side Scatter Cytometry) and fluorescence intensity data on the computer. Mixed population of cells with antigenic differences can be analyzed individually via their different levels of fluorescence at the appropriate wavelength, without the need for physical separation [1]. In the analysis of 140 blood samples, no false positive test was obtained signifying a 100% specificity of the method [28]. Based on his studies, Berglund produced an algorithm to detect blood doping from the conventionally refrigerated sample as such blood rapidly increases serum iron and bilirubin, and decreases EPO. Unfortunately the serum EPO is suppressed by physical exercise causing a limitation in its detection [46]. Since the mid-1980s, several other techniques for enhancing blood oxygen-carrying capacity were developed including blood transfusions, administration of Erythropoiesis stimulants, blood substitutes, natural or artificial altitude amenities, and novel gene therapies to enhance the endogenous Erythropoietic response [33].

Gene Doping

Defining Gene Doping

Gene doping is defined as “the non-remedial use of genes and genetic materials that have capability to enhance athletic performance”. The artificial gene is administered by direct injection of DNA into muscles; insertion of genetically modified cells; introduction utilizing a virus. Erythropoietin, insulin-like growth factor (IGF) and vascular endothelial growth factor (VEGF) are some of the substances used by athletes to increase their athletic performance [18]. ‘The 2017 Prohibited List’ given by ‘The World Anti-Doping Code’ includes Gene doping under Prohibited Method M₃ i.e. Gene Doping. According to this method the following are prohibited:

1. The transfer of polymers of nucleic acids or nucleic acid analogues;
2. The use of normal or genetically modified cells [34].

First addressed in 2001 by the International Olympic Committee and later prohibited in 2003 by the World Anti-Doping Agency (WADA), gene doping has raised concerns for several years; however there is no definitive evidence to support that gene therapy has ever been used as a form of athletic enhancement [12].

Genes used for Doping

Recombinant human erythropoietin (r-HuEPO)

EPO gene is responsible for production of hormone Erythropoietin which is produced mainly in the kidney (90%)

and in liver (10%). This gene is mainly used in clinical therapies of thalassemia and chronic anemia due to renal failure. It stimulates the Erythropoiesis in the bone marrow resulting in increased levels of hemoglobin and hematocrit. High level of Hb (Hemoglobin), Hct (hematocrit) and VO_{2 max} (maximum volume of oxygen) [28] are responsible for an increase transport for oxygen to tissues and hence increases athletic performance. The increased amount of red blood cells leads to high viscosity of blood leading to chances of heart attack [45]. Difficulty in detection adds to its doping advantage [30].

Recombinant Human Growth Hormone (r-HuGH)

Strength and power athletes such as weightlifters and sprinters started using rhGH to improve their muscle strength and decrease body fat [37].

Insulin-like growth factor-1 (IGF-1)

This gene is responsible for muscle mass and size [30]. Use of gene for IGF-1 disproportionately causes strong muscles [45]. It is synthesized by the skeletal muscle itself and acts locally. In a study by Musaro *et al.* (2001) mice induced with IGF-1 gene demonstrated marked muscle hypertrophy and increased injury healing response.

Myostatin gene (MSTN)

Myostatin (MSTN), or growth and differentiation factor 8 (GDF-8), is a member of the transforming growth factor (TGF-β) family which acts at physiological levels to limit muscle mass [50]. It prevents the uncontrolled growth of skeletal muscles. This gene is used in treatment of muscular dystrophy [30]. Removal of this gene might cause tears or fractures of bones [45]. Mosher *et al* performed artificial mutation in myostatin gene in racing Whippet dogs which resulted in ‘double muscled’ dogs with significantly less fat mass. These dogs showed markedly improved racing performance [30]. The first case of a human mutation in the MSTN gene was described in 2004 by Schuelke *et al.* where, a German athlete gave birth to a child with extraordinary musculature (mainly in the arms and legs) compared to a child of the same age [50].

Vascular Endothelial Growth Factor (VEGF)

This gene stimulates the production of new blood vessels [47]. It provides additional blood flow to the heart, lungs, muscles and other organs, therefore delaying exhaustion. Endorphins and Enkephalins are used pain-relief drugs for athlete’s body. This gene is an alternative to chemical drugs; which are taken for relief from pain [30].

Methods of Gene Doping

Viral method is most efficient method of gene transfer; but it requires a large commitment of financial resources to ensure the highest safety precautions are met. Another method is through ex vivo introduction, which involves removing a group of cells from the patient that are related to the disease [37]. The steps that made feasible and triggered a new era in the manufacturing of synthetic EPO were the isolation and characterization of the human DNA region that codifies endogenous EPO, and the creation of a complementary mold copy of the same region (c-DNA). All RhEPO produced by

different manufactures have different analogies, because they come from different sources of synthesis ^[4].

Risks involved in Gene Doping

With genetics in sports, athletes would not need to strive or make sacrifices to obtain good results causing the loss of the sport practice spirit and the loss of popularity of sport. Integration of viral vectors into the host genome carries the risk of insertional mutagenesis post humanism or trans-humanism. Gene Doping is not only causing harm to the athlete's health but also to others; means to the future individual ^[45]. Gene therapy might develop leukemia and shows flu like symptoms ^[30].

Detection of Gene Doping

There are many possible methods of detecting gene doping. Artificially manipulated genes are likely identical to naturally occurring genes and its products ^[37]. The research has yielded several different prospective methods for testing; including "muscle biopsy" and "Indirect measurement of enzymes or proteins" ^[45] and techniques such as microarray or sequence-based transcriptional profiling and proteomic and metabolomic

analyses that can define molecular "signatures" of exposure to specific doping agents, or families of drugs, or methods. These help to identify disturbance in physiology ^[18]. The easiest test is the molecular test-to detect insertion vector in the plasma and other body fluids; but the disadvantage of this test is vectors have short half life. Therefore, the test should be carrying out in short period of time. Muscle biopsy at the site of the injection is reliable method for detection of gene doping provided that the athlete submits readily since this method is invasive ^[17].

Another method is 'genetic bar code method' or 'labeling of gene transfer products'. The engineered genes do not contain introns. This fact can be used in detecting gene doping by using molecular tests, but the disadvantage of this technique is it requires tissue sampling like muscle biopsies. This method of testing is invasive in nature so very unlikely to be accepted by athletes and sporting authorities. Structural differences between endogenous and RhEPO can be detected by this technique ^[37]. The review of the work done by François Lasne and colleagues (2004) suggested that in a comparative study of the iso-electric profiles of physiological Epo and Epo resulting from in vivo gene transfer in primates, it was found that the induction of exogenous Epo resulted in over expression and

Table 1. Detection techniques of Blood Doping and Gene Doping suggested by different authors

Author and Year	Detection Technique Used	Limitations of Technique
Wolfgang Jelkmann and Carsten Lundby (2015); Lippi et al. (2006); Unal et al. (2004)	Athlete's Biologic Passport or Hematological passport	The measuring devices, processing of the analytical data and the assessment of abnormal parameters to be the result of doping; the applicability in sports practice; the impact on research.
Wolfgang Jelkmann and Carsten Lundby (2015); Lippi et al. (2006); Arndt et al. (2004)	Allogenic transfusion: a.Direct detection of blood or urine samples b.(for transfusion)- flow cytometry Autologous transfusion: c.Indirect detection (for autologous blood transfusion)	May give false-positive results. It does not detect autologous transfusion.
Truong HB and Ip EJ (2012), Robinson et al. (2006), Haisma et al. (2006), Bento et al. (2003)	RhEpo detection a.Direct method:- isoelectric technique based on hyposulfated sugar concentration in urine b. Indirect method: Measuring various parameters like Hct, serum erythropoietin concentration, sTFR, reticulocytes, 1.ON model- measures RhEPO shortly after use. 2.OFF model- identify RhEPO weeks after stopping treatment	Time consuming, expensive. Need for blood, need for counter analysis.
Dr. kamble et al. (2012), Haisma et al. (2006)	Molecular tests to detect Insertion vectors in the plasma and other body fluids of a person	Vectors (Plasmids and virus vectors) have very short half life. Therefore, we need to carry out these tests with relatively shorter intervals and with regular testing regimes.
Haisma et al. (2006)	'Genetic bar code method' or labeling of gene transfer products	Need for the complete Cooperation of scientists, ethicists, athletes, sports authorities, medical practitioners, professional societies and none the less, public.
Baoutina et al. (2010)	The engineered genes do not contain introns. This fact can be used in detecting gene doping molecular tests PCR assays to detect small amount of Epo	Involve tissue sampling like muscle biopsies. Invasive nature- not accepted by athletes cDNA-EPO sequence is modified by insertion of small introns in a targeted exon/exon junction or by site-directed mutagenesis of sequences for primers and/or probe annealing.
Mayne et al. (2008), Fore et al. (2010)	Muscle biopsy Indirect measurement of enzymes or proteins	Invasive and the majority of athletes would not be willing to undergo this test before or after training or competition. These levels may be increased or decreased due to the gene that has been altered in the cells.
	Proteomic Database- method of testing that would be specific to each athlete.	Require consistent measuring of various Proteins and hormones in the blood and comparing them to reference levels.
Brand et al. (2014)	Indirect test- implicit attitude test (IAT) and Picture-based doping-BIAT Direct test- PEAS(The Performance Enhancement Attitude Scale)	Reaction time can be changed

thus a different isoelectric pattern than the endogenous form was observed^[12]. Difficulties in detection are due to the fact that EPO is a complex macromolecule, present in low concentrations in biologic fluids, with quite a similar structure to its endogenous form, which made impossible for one to accurately identify its illicit use for a long time. Two mathematic models were designed with the use of data from placebo and RhEPO: the ON model, to identify current RhEPO users, and the OFF model, which was intended to identify the athlete who had recently discontinued RhEPO administration. At the same time, a direct test to detect RhEPO was developed by Paris doping control lab, based on subtle differences between RhEPO and physiologic EPO carbohydrate residues^[4]. Even with advanced biotechnology, gene doping may not always be detected thus giving an advantage to this technique^[12]. The problem with measuring gene product levels is that it fails to distinguish doped athletes from athletes with natural genetic mutations that cause them to have high levels without artificial enhancement^[17]. The detection methods should be highly specific, sensitive and be properly validated to be able to withstand legal scrutiny^[2]. The development of detection methods at the global scale, educating the athletes regarding the risks of gene doping and re-evaluating the existing regulations for gene therapy are the few preventive measures that should be undertaken^[30].

RESULTS AND DISCUSSION

Athletes are tempted to use prohibited substances in order to improve their strength. These prohibited substances are not only used by athletes in the world of sports but also amongst individuals, mostly young ones, who are engaged in sports recreationally. Some drugs like erythropoietin and growth hormones, and methods like autologous blood transfusion are very difficult to detect as they mimic naturally present hormones in body. This is the main drawback of all the detection tests which are derived for the purpose of offering fair-play to all the athletes^[44]. Gene doping is providing WADA and other anti-doping organizations with their greatest challenge in the fight to preserve clean competition^[37]. The study of Deckx *et al.* (2012) concluded that 94% respondents thought that gene doping was equivalent to cheating. However, lack of similar studies with regard to doping and gene doping suggested that, there is a need for sociological, behavioral and ethical research to query the attitudes of athletes to the use of doping in sports. As there is a need to overcome the problem of doping in sports to achieve fair play, the scope for analysis of Prohibited Substances and Prohibited Methods is widened. Athletes are indulging in the use of new drugs that can alter their physiology and can mask their presence. Being active in the field of Research related to Doping is crucial now, thereby stating that this study has practical scope in future.

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REFERENCES

- [1.] Arndt, Patricia A, & Kumpel, Belinda M. 2008. Blood doping in athletes—detection of allogeneic blood transfusions by flow cytometry. *American journal of hematology*, 83(8), 657-667.
- [2.] Baoutina, A, Coldham, T, Bains, GS, & Emslie, KR. 2010. Gene doping detection: evaluation of approach for direct detection of gene transfer using erythropoietin as a model system. *Gene therapy*, 17(8), 1022-1032.
- [3.] Baron, David A, Martin, David M, & Magd, Samir Abol. 2007. Doping in sports and its spread to at-risk populations: an international review. *World Psychiatry*, 6(2), 54-59.
- [4.] Bento, Rafael Maia de Almeida, Damasceno, Lúcia Menezes Pinto, & Aquino Neto, Francisco Radler de. 2003. Recombinant human erythropoietin in sports: a review. *Revista Brasileira de Medicina do Esporte*, 9(3), 181-190.
- [5.] Bette, Karl-Heinrich, & Schimank, Uwe. 2001. Coping with Doping: Sport associations under organizational stress. *Paper presented at the Proceedings from the Workshop Research on Doping in Sport*.
- [6.] Böning, D, Maassen, N, & Pries, A. 2011. The Hematocrit Paradox—How Does Blood Doping Really Work? *International journal of sports medicine*, 32(04), 242-246.
- [7.] Brand, Ralf, Heck, Philipp, & Ziegler, Matthias. 2014. Illegal performance enhancing drugs and doping in sport: a picture-based brief implicit association test for measuring athletes' attitudes. *Substance abuse treatment, prevention, and policy*, 9(1), 7.
- [8.] Catlin, DH, Fitch, Ken D, & Ljungqvist, Arne. 2008. Medicine and science in the fight against doping in sport. *Journal of internal medicine*, 264(2), 99-114.
- [9.] Cazzola, Mario. 2002. Further concerns about the medical risks of blood doping: *Haematologica*.
- [10.] Coleman, Doriane Lambelet, & Coleman, James E. (2008). The problem of doping. *Duke Law Journal*, 57(6), 1743-1794.
- [11.] Curtis, Andrew, Gerrard, David, Burt, Peter, & Osborne, Hamish. 2015. Drug misuse in sport: a New Zealand perspective. *NZ Med. J*, 128, 62.
- [12.] Deckx, Seppe. 2012. The Ethics of Gene Doping: A Survey of Elite Athletes and Academic Professionals. *J Clinic Res Bioeth* 2012, 3:2
- [13.] Deligiannis, Asterios, Björnstad, Hans, Carre, Francois, Heidbüchel, Hein, Kouidi, Evangelia, Panhuyzen-Goedkoop, Nicole M. Vanhees, Luc. 2006. ESC study group of sports cardiology position paper on adverse cardiovascular effects of doping in athletes. *European Journal of Cardiovascular Prevention & Rehabilitation*, 13(5), 687-694.
- [14.] Eichner, E Randy. 2007. Blood Doping. *Sports Medicine*, 37(4-5), 389-391.
- [15.] Engelberg, Terry, & Skinner, James. 2016. Doping in sport: Whose problem is it? *Published by Elsevier Ltd on behalf of Sport Management Association of Australia and New Zealand*. 1441-3523/ 19(1-5)
- [16.] Foddy, Bennett, & Savulescu, Julian. 2007. Ethics of performance enhancement in sport: drugs and gene doping. *Principles of Health Care Ethics, Second Edition*, 511-519.
- [17.] Fore, Joe. 2010. Moving beyond gene doping: Preparing for genetic modification in sport. *Va. JL & Tech.*, 15, 76.
- [18.] Friedmann, Theodore, Rabin, Olivier, & Frankel, Mark S. 2010. Gene doping and sport. *Science*, 327(5966), 647-648.

- [19.] Gledhill, Norman. 1981. Blood doping and related issues: a brief review. *Medicine and Science in Sports and Exercise*, 14(3), 183-189.
- [20.] HADLEY, BRENT. 2007. Doping and Sport: Guilty and never proven innocent?, *Embry-Riddle Aeronautical University*.
- [21.] Haisma, HJ, & De Hon, O. 2006. Gene doping. *International journal of sports medicine*, 27(04), 257-266.
- [22.] Harvey, Stephen, & Jarrett, Kendall. 2014. A review of the game-centred approaches to teaching and coaching literature since 2006. *Physical Education and Sport Pedagogy*, 19(3), 278-300.
- [23.] Hoberman, John. 2001. Sportive nationalism and doping. *Proceedings from the Work Shop Research on Doping in Sport*, 7-9.
- [24.] Houlihan, B. 2001. Sport policy and doping: a research agenda. *Proceedings from the Work Shop Research on Doping in Sport*, 7-9.
- [25.] Houlihan, Barrie. 2014. The Government and Politics of Sport (RLE Sports Studies) Routled (Vol. 6)
- [26.] Hughes, David. 2015. The World Anti-Doping Code in sport. *Aust Prescr*, 38(5), 167-170.
- [27.] Hunt, Thomas M. 2007. Sport, drugs, and the cold war. *The conundrum of Olympic doping policy. 1970-1979, Olympika XVI*, 19-42.
- [28.] Jelkmann, Wolfgang, & Lundby, Carsten. 2011. Blood doping and its detection. *Blood*, 118(9), 2395-2404.
- [29.] Jones, M, & Pedoe, DS Tunstall. 1989. Blood doping--a literature review. *British Journal of Sports Medicine*, 23(2), 84-88.
- [30.] Kamble, Prathamesh H, Bhamare, Sunil S, Wankhede, Sachinkumar, & Maske, Shital S. 2012. "Gene doping in sports: A medical perspective." *Indian Journal of Basic and Applied Medical Research*. 1.157-165
- [31.] Koh, Benjamin, Freeman, Lynne, & Zaslowski, Christopher. 2012. Alternative medicine and doping in sports. *The Australasian medical journal*, 5(1), 18.
- [32.] Lee, Yu-Hsuan. 2006. Performance Enhancing Drugs: History, Medical Effects & Policy.
- [33.] Lippi, Giuseppe, & Banfi, Giuseppe. 2006. Blood transfusions in athletes. Old dogmas, new tricks. *Clinical Chemical Laboratory Medicine*, 44(12), 1395-1402.
- [34.] List, Prohibited, & Exemptions, Therapeutic Use. 2016. World Anti-Doping Code. *International Standart.-2016.-16 s*.
- [35.] López, Bernat. 2011. The invention of a 'drug of mass destruction': Deconstructing the EPO myth. *Sport in History*, 31(1), 84-109.
- [36.] Mandarić, Sanja, & Delibašić, Veljko. 2014. Sanctions for doping in sport. *Fizička kultura*, 68(1), 39-49.
- [37.] Mayne, Ian Patrick. 2008. Gene Doping in the Olympics: a Race to the Bottom. *University of Toronto Medical Journal*, 85(2), 82-86.
- [38.] Mitić, Petar, & Radovanović, Dragan. 2011. The motives for doping drug use in nonprofessional athletes and methods of prevention. *Facta Universitatis: Series Physical Education and Sport*, 9(2), 203-212.
- [39.] Nelson, Margaret, Ashenden, Michael, Langshaw, Mark, & Popp, Hazel. 2002. Detection of homologous blood transfusion by flow cytometry: a deterrent against blood doping. *haematologica*, 87(8), 881-882.
- [40.] Patricios, JS, & Collins, RM. 2010. Boksmart: pre-participation screening of rugby players by coaches based on internationally accepted medical standards: review. *South African Journal of Sports Medicine*, 22(3), 62-65.
- [41.] Prokop, Ludwig. 1970. The struggle against doping and its history. *The Journal of sports medicine and physical fitness*, 10(1), 45
- [42.] Robinson, N, Giraud, S, Saudan, C, Baume, N, Avois, L, Mangin, P, & Saugy, M. 2006. Erythropoietin and blood doping. *British journal of sports medicine*, 40(suppl 1), i30-i34.
- [43.] Rohatgi, Vishesh. 2012. Doping in sports-past, present and future. *International Journal of Current Research and Review*, 4(22), 133.
- [44.] Savulescu, Julian, Foddy, Bennett, & Clayton, Megan. 2004. Why we should allow performance enhancing drugs in sport. *British journal of sports medicine*, 38(6), 666-670.
- [45.] Triviño, José Luis Pérez. 2011. Gene doping and the ethics of sport: Between enhancement and posthumanism. *International Journal of Sports Science*, 1(1), 1-8.
- [46.] Truong, HB, & Ip, EJ. 2012. A Review of Erythropoietin Abuse: An Analysis of Effectiveness and Safety in Exercise. *Journal of Sports Medicine and Doping Studies*, 2.
- [47.] Unal, Mehmet, & Unal, Durisehvar Ozer. 2004. Gene doping in sports. *Sports Medicine*, 34(6), 357-362.
- [48.] Vieweg, Klaus. 2004. The Definition of Doping and the Proof of Doping Offense (an Anti-Doping Rule Violation) under Special Consideration of the German Legal Position. *Marq. Sports L. Rev.*, 15, 37.
- [49.] Waddington, Ivan. 2001. Doping in sport: a medical sociological perspective. *Research in Doping in Sport*, 11-21.
- [50.] Yamada, André Katayama, Verlengia, Rozangela, & Bueno Junior, Carlos Roberto. 2012. Myostatin: genetic variants, therapy and gene doping. *Brazilian Journal of Pharmaceutical Sciences*, 48(3), 369-377.
- [51.] Yesalis, Charles E, & Bahrke, Michael S. 2002. History of doping in sport. *International sports studies*, 24(1), 42-76.

A Review of Arsenic in Drinking Water : Indian Scenario (2007-2017)

Manasi Shewale¹, Deepika Bhandari², R. K. Garg³

¹Student, Institute of Forensic Science, 15, Madame Cama Road, Fort, Mumbai, Maharashtra, India

²Assistant Professor, Department of Forensic Science, Institute of Forensic Science, Madame Cama Road, Fort, Mumbai, Maharashtra, India

³Professor, Department of Forensic Science, Punjabi University, Patiala, Maharashtra, India

ABSTRACT

Arsenic is considered to be a major environmental pollutant and its exposure occurs through environmental, occupational and medical sources. Arsenic contaminated drinking water is the main source for arsenic exposure especially in the South Asian regions. It is highly toxic and carcinogenic in nature. Therefore, high concentration of arsenic present in the drinking water is considered as a danger to human health. From the past few years, the contamination of drinking water because of arsenic is increasing especially in the northern and north eastern region of India. The ground water was previously considered as safe for drinking but now due to increasing amount of arsenic in it has lead to contamination of the groundwater and hence is harmful for humans. This amount has crossed the permissible amount of arsenic in drinking water that is 10 µg/l. Long term exposures to arsenic contaminated drinking water leads to Arsenicosis, also cancer of skin, bladder, liver, kidney and skin diseases. In this review paper we have reported most of the studies/ research where quantity of arsenic in drinking water has been reported for the Indian sub-continent after the year 2007.

Keywords: Arsenic, Groundwater, Contamination, Drinking Water.

I. INTRODUCTION

Arsenic and its Properties

Arsenic is a semi-metallic or a metalloid element. It is tasteless and odorless and is found in nature in the earth's crust as sulfide ores. Arsenic is found in soil, water and air due to its release from volcanoes or industrial processes and also by combustion of fossil fuels. [33] Occurrence of arsenic in a particular area depends on its geographical location. It is found in organic, inorganic and gaseous (arsine gas) form in the environment. It is toxic and carcinogenic in nature. [38] Inorganic arsenic is stable in oxidation states (-3, 0, +3, +5) but is naturally found in its trivalent and pentavalent state. Inorganic arsenic is mostly found in industry and in private well water in some parts of the country. [15] Arsenic is a potent hemolytic poison in cases of both acute and chronic poisoning. The toxicity level of an arsenic compound depends on its valence state, solubility, physical properties, rate of absorption and

elimination, etc. [31] Inorganic trivalent compounds of arsenic are most toxic whereas elemental arsenic is the least toxic. Arsenic gas is considered to be the most toxic in acute cases. [38]

Arsenic is considered as group 1 carcinogen i.e. it is well known as fatal to humans. Acute and chronic poisoning are the two types of arsenic poisoning. Usually acute arsenic poisoning occurs when the arsenic is accidentally ingested i.e. as pesticides or insecticides and sometimes for suicide. [43] Doses less than 5mg causes diarrhoea and vomiting and can be resolved within 12 hours with or without treatment. However, doses in the range of 100mg to 300mg are considered as lethal and can cause death within 24 hours to 4 days after consumption of arsenic. [38] Arsenicosis is the term used to refer to long term or chronic poisoning of arsenic. Arsenic absorbed in the body is accumulated in liver, lungs, kidney, nervous system, heart, spleen, hair, nails and skin. This leads to multiple organ failure and hence malignance. [6]

II. METHODS AND MATERIAL

Essentiality of Arsenic in the Human Body

Arsenic is essential in trace amounts in animals as well as humans. A very minute amount of arsenic 0.00001% is needed to be present in the human body for proper growth and healthy nervous system. Decreased serum arsenic concentration may lead to disease in central nervous system and cancer. It is a major clinical nutritional concern in humans as both low ($< 12 \mu\text{g}/\text{day}$) or high (more than $250 \mu\text{g}/\text{day}$) intake can possibly induce susceptibility to cancer of urinary bladder, kidney, liver, skin, lung. Human serum arsenic levels are measured by atomic absorption spectroscopy and the normal amount is $0.02 \mu\text{g}/\text{ml}$. The normal urinary excretion of arsenic is $2\text{-}25 \mu\text{g}/\text{ml}$. The concentration of arsenic in hair is $0.15\text{-}0.35 \text{ mg}/\text{kg}$ and in nails it is $0.25\text{-}0.34 \text{ mg}/\text{kg}$. The permissible amount of arsenic in drinking water is $10 \mu\text{g}/\text{l}$.^[15]

Arsenic Exposure and its Effects

Human Exposure to arsenic can be through food, water or air. Arsenic enters the food web from plants which are sprayed with arsenic containing pesticides or insecticides. Inhalation of arsenic or exposure to arsenic through air is seen in areas where mining is done or in industrial places where arsine is released in a large amount. Mostly human exposure to arsenic is due to intake of water containing arsenic in trace amounts for a long period of time or intake of water containing excess amount of arsenic beyond its permissible value. Presence of arsenic in drinking water can be due to various sources which mostly include the industrial effluents which are let out into the rivers or lakes, erosion of rocks, mining and due to contact of groundwater with insecticides or pesticides.^[43] Arsenic can cause damage to internal organs without any external symptoms and hence arsenic poisoning detection is very difficult to identify. Symptoms are seen only after 10 years of exposure and in some cases it may take 20 years also.^[1]

WORLD SCENARIO

Arsenic contamination is an issue of concern worldwide and it is a considerable risk factor in various countries including Bangladesh, Taiwan, India, Mexico, China,

Chile, Argentina, and USA.^[2] Over the past decade concentration of arsenic in drinking water is increasing and hence the risk to human health is also increasing and is now considered as a threat to the human health. WHO has set the minimum amount of arsenic in drinking water to be 10ppb .^[31]

Most of the tube wells from all the countries contained more than $10 \mu\text{g}/\text{l}$ arsenic and also in some of the countries in South Asia, the arsenic content was $2,500 \mu\text{g}/\text{l}$. In countries like Argentina and Cordoba province, the levels of arsenic in water are found to be very high, i.e. $5000 \mu\text{g}/\text{l}$ and $11,500 \mu\text{g}/\text{l}$ respectively.^[3]

WHO in 2010 gave a report on exposure to arsenic. This report concentrated on the effects of inorganic arsenic as a toxic substance and active carcinogen to the human body. The groundwater contains arsenic in large amounts and hence the risk to human health has increased. Most of the countries like Argentina, Bangladesh, Chile, China, India, Mexico and USA have arsenic in their tube wells. WHO gave another report in 2011 which said that the maximum amount of naturally occurring arsenic in ground water is $25 \text{mg}/\text{l}$.

The amount of arsenic present in the drinking water of some of the countries was estimated. The countries like America, European countries and the African countries follow $10 \mu\text{g}/\text{l}$ to be the permissible value. It was found out that Australia has set up the most severe value of $7 \mu\text{g}/\text{l}$ as the minimum permissible value of arsenic in drinking water.^[24]

INDIAN SCENARIO

The water of the rivers like Ganga and Brahmaputra are highly contaminated by arsenic and hence the states which are situated on the basin of these rivers like West Bengal, Bihar, Uttarakhand, Uttar Pradesh and some of the north eastern states are highly affected. The first case regarding the arsenic contamination in drinking water was reported in Chandigarh in the 20th century.

In 2007, Mazumder reported that Arsenic content in the drinking water in the state of West Bengal was found to be $330 \mu\text{g}/\text{l}$. In his further study in 2010, he reported that the amount of arsenic in drinking water has increased to $1362 \mu\text{g}/\text{l}$.^[1]

According to the North Eastern Regional Institute of Water and Land Management, concentration of arsenic in water in the North Eastern states like Assam, Tripura,

Manipur, Nagaland and Arunachal Pradesh is 300ppb. Arsenic is a virulent poison. Its ingestion if 76mg in acute dose is considered to be fatal.^[9]

In India, arsenic contamination is seen in the northern and north eastern states. The approximate range of arsenic found in these states is 50-3200 µg/L.^[34]

The contamination of arsenic in the basins of the rivers Ganga and Brahmaputra was reported. The states in which these rivers flow are West Bengal, Assam, Jharkhand, Bihar, Uttar Pradesh and Manipur. Most of the drinking water in these states is obtained by the rivers or ground waters of the above rivers which leads to arsenic exposure. The water of these regions contains arsenic in more than 10µg/L. The mean or the average amount of arsenic in the basin of these rivers is 200 mg/l.^[12]

A study was conducted on the effects of arsenic and its increasing concentration in the Gangetic plain, Bihar, India. It was reported that arsenic concentration in Bihar is 1654µg/L. Some of the highly contaminated districts in Bihar are Buxar, Bhojpur, Patna, etc.^[33]

In the state of Uttar Pradesh, India it was observed that the range of arsenic in the water was 2.0-1310ppb but most of the samples had arsenic more than 50 ppb. 50ppb is considered as the permissible value of arsenic in drinking water.^[19] The districts like Ballia and Kheri have highest amount of arsenic in their drinking waters. The range of arsenic was found to be very high i.e. 4800-6300 ppb which has increased significantly from the past few years in the district Ballia in the state of Uttar Pradesh.^[41]

Concentration of arsenic in drinking water (India)

Name of the state	Source of arsenic	Concentration (µg/L)	Reference
West Bengal	Ground water	≥ 500	Chakraborti <i>et al</i> (2009) and
- Paraganas		1321	
- Murshidabad		2037	
- Howrah		50-155	
- Hugli		510	
Uttar Pradesh	Ground water	≥1300	Kunar <i>et al</i> (2009)
- Ballia		1310	
- Mathura		520	
Bihar	Ground water	≥1800	Kunar <i>et al</i> (2009)
- Patna		1810	
- Buxar		1222-1400	
- Bhojpur		1630	
- Samastipur		626	
Chattisgarh	Ground water	50-1890	Kunar <i>et al</i> (2009)
Assam	Ground water	100-200	Devi <i>et al</i> (2009)
Manipur	Ground water	798-986	Devi <i>et al</i> (2009)
Arunachal Pradesh	Ground water	618	Devi <i>et al</i> (2009)

III. RESULTS AND DISCUSSION

The WHO and ISO have given the permissible value of arsenic in the drinking water as 10µg/L.^[6] The BIS has given the permissible value of arsenic in the drinking

water 50µg/L but later it was changed to 10µg/L. The drinking water containing arsenic beyond this limit becomes toxic. The arsenic content in West Bengal, India is 3200µg/l.^[3] It has led to multisystem diseases, cardiovascular diseases, reproductive failures and

different types of cancers. The North Eastern states of India also have high amount of arsenic i.e. more than 300 μ g/L which has caused deaths of half of the people living in these villages.^[9] The techniques used for detection of arsenic in drinking water are HG-AAS; Hydride Generation Atomic Absorption Spectroscopy.^[4] Arsenic less than 10 μ g/L is very essential in the human body as it plays a major role in proper growth and healthy nervous system but excess amount can lead to arsenic poisoning^[15] After West Bengal, the state of Uttar Pradesh is considered to be containing high amounts of arsenic in ground water i.e. 1310 μ g/L. The Ballia district is highly affected by arsenic contamination.^[19] The rivers like Ganga and Brahmaputra are highly contaminated with arsenic and contain 300 μ g/L of arsenic approximately.^[27] The state of Bihar is found to be having 1654 μ g/L arsenic in water.^[33] The state of Uttar Pradesh has concentration of arsenic as 4800-6300 μ g/L which has led to increased deaths of children and some adults.^[41] In order to reduce the level of arsenic to the permissible level different types of programmes were started by the government and have been implemented also. Awareness Programmes^[23], Rain water Harvesting programme in order to divert the excessive use of arsenic contaminated ground water, etc. have been implemented.^[13]

IV. CONCLUSION

From the above discussion it is clear that arsenic level has increased highly from the past few years. The states like West Bengal, Uttar Pradesh, Bihar and Assam are the highly polluted states in India. The major reason for presence of arsenic in the ground water is the entry on industrial effluents containing arsenic into the rivers and lakes. These rivers and lakes the source of drinking water to majority of India's population. Another reason is that excess digging of the tube wells has led to naturally occurring arsenic in the soil to enter into the water and hence into the food chain of humans. Therefore it has become necessary now to implement some measures in order to resolve this issue. Various techniques like rain water harvesting have been implemented in order to divert the people from using ground water for drinking and other household purposes which lead to exposure to arsenic.

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VI. REFERENCES

- [1]. Mazumder DN. (2007); Effect of Drinking Arsenic Contaminated Water in Children; Indian Pediatrics; 44, 925-927
- [2]. Singh N., Kumar D. and Sahu A. (2007); Arsenic in Environment: Effects on Human Health and Possible Prevention; Journal of Environmental Biology; 28(2), 359-365.
- [3]. Petrusevski B. and Sharma S. (2007); Arsenic in Drinking Water; IRC International Water and Sanitation Centre; 17, 1-57.
- [4]. Shraim A., Yousef I., Kanan S., Abdo N., Olszowy H., Petry S. and N J. (2008); Quantification of Total Arsenic in Groundwater by HG-AAS Using Low Acid Concentration and L-Cysteine; Journal of International Environmental Application And Science; 3(4), 215-223.
- [5]. Khurana I. and Sen R. (2008); Drinking water Quality in Rural India: Issues and Approaches; Water Aid; 1-31.
- [6]. Mazumder DN. (2008); Chronic Arsenic Toxicity and Human Health; Indian Journal of Medical Research; 436-447.
- [7]. Kozhisseri D. (2008); Now Arsenic in Karnataka; 1-5.
- [8]. Kunar S., Jain S., Shekhar S. and Sharma V. (2009); Arsenic In Ground Water in India : An Overview; Bhujal News Quarterly Journal; 1-8
- [9]. Devi L., Chandra I. and Shihua I. (2009); Recent Status of Arsenic Contamination In Ground Water Of Northeastern India- A Review; 1(3), 22-32.
- [10]. An Overview of Arsenic in Drinking Water-Tamil Nadu; Government of Tamil Nadu Water Resources Department (2009); 1-11.
- [11]. Chakraborti D., Das B., Rahman M., Chowdhury U., Biswas B., Goswami A., Nayak B., Pal A., Sengupta M., Sad A., Hossain A., Basu G., Roychowdhury T. and Das Dipankar (2009); Status of groundwater arsenic contamination in the state of West Bengal, India: A 20-year study report; Molecular Nutrition Food Research Journal; 53, 542-551.
- [12]. Ghosh N., Singh R. and Scientist F. (2009); Groundwater Arsenic Contamination in India: Vulnerability and Scope for Remedy; 1-24.

- [13]. Young C. (2009); Scientists solve puzzle of arsenic-poisoning crisis in Asia; Stanford Report; 1-3.
- [14]. Mazumder DN., Ghosh A., Majumdar K., Ghosh North., Saha C., and Mazumder RN. (2010); Arsenic Contamination of Ground Water and its Health Impact on Population of District of Nadia, West Bengal, India; India Journal Of Community Medicine; 35(2), 331-338.
- [15]. Pimparkar B and Bhawe A. (2010); Arsenicosis Review of Recent Advances; Journal of Association of Physicians, India; 58, 617-629.
- [16]. Chouhan S. and Flora S. (2010); Arsenic and Fluoride: Two major ground water pollutants; Indian Journal Of Experimental Biology; 48, 666-678.
- [17]. World Health Organisation (2010); Exposure to arsenic: A major public health concern; 1-5.
- [18]. Bhagure R. and Mirgane R. (2011); Heavy metal concentrations in groundwaters and soils of Thane Region of Maharashtra, India; 173(1-4), 52-643.
- [19]. Rajashekhar D. (2011); Arsenic Mitigation in Rural Drinking Water Sources In Ballia District, Uttar Pradesh State; Ministry of Drinking Water and Sanitation Government of India, 1-28.
- [20]. Khan M. and Ho Y. (2011); Arsenic in Drinking Water: A Review on Toxicological Effects, Mechanism of Accumulation and Remediation; Asian Journal of Chemistry; 23(5), 1889-1901.
- [21]. World Health Organisation (2011); Arsenic in Drinking Water, 1-16.
- [22]. Food and Agriculture Organization Of The United Nations (2011); Ganges-Brahmaputra-Meghna Basin; 1-15.
- [23]. India Water Portal; Arsenic (2012); 1-10.
- [24]. Kumar A. and Singh M. (2012); A Global Problem Of Arsenic In Drinking Water & Its Mitigation- A Review; International Journal of Advanced Engineering Technology; 03, 196-203.
- [25]. Chaurasia N., Mishra A. and Pandey S. (2012); Finger Print of Arsenic Contaminated Water in India-A Review; Journal of Forensic Research; 3(10), 1-4.
- [26]. Srivastava A. (2013); Arsenic-21st Century Calamity- A Short Review; Research Journal of Recent Sciences; 3, 7-13.
- [27]. Chowdhury S., Jiang J., Ashekuzzaman S., Jiang A. and Sharifuzzaman S. (2013); Arsenic Contaminated Groundwater and Its Treatment Options in Bangladesh; International Journal Of Environmental Research and Public Health; 10, 18-46.
- [28]. UNICEF (2013); Arsenic Contamination IN Ground Water; 2, 1-4.
- [29]. Das A. (2013); Ground Water Arsenic Contamination-A Study of Major Arsenic Affected Districts of West Bengal; International Journal of Science and Research; 4(6); 2993-2996.
- [30]. Shankar S., Shanker U. and Shikha (2014); Arsenic Contamination of Groundwater: A Review of Sources, Prevalence, Health Risks, and Strategies for Mitigation; The Scientific World Journal; 2014, 1-18.
- [31]. Dey T., Banerjee P., Bakshi M., Kar A. and Ghosh S. (2014); Groundwater Arsenic Contamination in West Bengal: Current Scenario, Effects and Probable Ways of Mitigation; International Letters Of Natural Sciences; 13, 45-48.
- [32]. Shrivastava A., Barla A., Yadav H., Bose S. (2014); Arsenic contamination in shallow groundwater and agricultural soil of Chakdaha Block, West Bengal, India; <http://journal.frontiersin.org/article/10.3389/fenvs.2014.00050/full1/>; 1-20.
- [33]. Singh S. (2015); Groundwater Arsenic Contamination in the Middle Gangetic Plain, Bihar (India): The Danger Arrived; International Research Journal of Environmental Sciences; 4(2), 70-76.
- [34]. Kainth G. (2015); Arsenic Poisoning in Drinking Water; Huge Public Health Problem; A journal of Analysis and News; 1-24.
- [35]. Tantry B., Shrivastava D., Taher I. and Tantry M. (2015); Arsenic Exposure: Mechanisms of Action and Related Health Effects; Journal of Environmental and Analytical Toxicology; 5, 1-5.
- [36]. Pandey N., Lehri A., Mehrotra S. and Shrivastava J. (2015); Arsenic Pollution Scenario in Eastern UP, India: A Review; International Research Journal of Environment Sciences; 4(11), 83-86.
- [37]. Sahu S. (2016); Ministry of Drinking Water and Sanitation; 1-18.
- [38]. Joshi T., Gaur G., Agarwal M., Singh T. and Gauba P. (2016); Arsenic Toxicity; Journal of Chemical and Pharmaceutical Research; 8(6), 240-245.
- [39]. World Health Organization (2016); 1-2.
- [40]. World Health Organisation (2016); Arsenic; 1-5.
- [41]. Bose T. (2017); Arsenic contamination in groundwater killing villagers in Ballia; 1-2.
- [42]. Chakraborty M. (2017); West Bengal: Poisoned by Water- A review Article, 1-2.
- [43]. Nordberg G., Fowler B., Nordberg M., Friberg L., Chou S., Jones R. and Chen C. (2007); Handbook on the toxicology of the metals; 3, Chapter 19; Arsenic, 368-397.

Worry Assessment by Handwriting Analysis of Right-Handed and Left-Handed Individuals

Lavanya Mudaliar, Deepika Bhandari, Akshata Dabholkar

Institute of Forensic Science, 15- Madame Cama Road, Fort, Mumbai, Maharashtra, India

ABSTRACT

Handwriting refers to a person's unique style of writing characters created by hand with a writing instrument such as a pen or pencil. Handwriting is an acquired skill and a complex-perpetual-motor task, sometimes referred to as a neuromuscular task. Because each person's handwriting is unique, it can be used to verify the writer of the document. Graphology is the study by which the personality of an individual can be determined with the help of handwriting. It will reveal his social skills, honesty, stability, confidence level and how he compares himself to others. Handwriting being a neuromuscular activity also has an impact with regard to handedness of the writer. It is hypothesized that the Left-Handed writers are much different than the Right-Handed writers with respect to their personalities. Therefore, this work aims to study the Worry assessment with respect to the handedness of the writer, based on certain characters of handwriting like: pen pressure, size of letters, slant of words, spacing between the words, shape of the words, page margins, etc. Fifty(50) samples each of Right-handed and Left-handed individuals between the age group of 18-30 years were analyzed to determine the personality traits of the individuals. The results were then compared depending on the handedness of writers.

Keywords: Worry assessment, personality, Graphology

I. INTRODUCTION

Handwriting is a complex motor skill involving a combination of sensory, neurological, and physiological impulses. It results due to factors like visual perception, knowledge of form, pathways of central nervous system, anatomy and physiology of bones and muscles of arm^[9]^[10]. On achieving the mastery on handwriting through practice, the writer tends to deviate from the copybook form of writing and begins to exclaim his own individual characteristics. Thus, writing becomes a pattern of subconscious habitual formation, which is repeated in every writings^[9]^[10]. The way a person places the words on a page expresses his individuality. An expert can identify these relevant features of handwriting and the reasons of their occurrence thereby analyzing the personality of the writer.

The study of handwriting identification is a discriminatory process. The two fundamental fields of study pertaining to handwriting are - the study of handwriting as a neuromuscular activity, skill development and the effect of various internal and

external factors upon it. The second uses the knowledge acquired through the first, but is entirely independent of it, therefore, handwriting identification, fingerprint identification, firearms identification, blood grouping and DNA analysis are discriminatory processes.

Graphology is understanding of the 'human psyche' through brain impulses transmitted onto paper which create 'written expression' regardless if it is handwriting, printing, art, doodles, signatures or numerical. All these forms 'graphic expression' and reveal our 'personality and character'. Handwriting analysis that deals with personality traits may not be completely consistent with its findings, but it can be used to identify neurological conditions.

Handwriting depicts the personality of an individual. While deciding a case in Court of Law, *Mens Rea* i.e., the intention of the accused is taken into consideration and hence, when intention is to be determined, the personality of the person is counted on. Also, in cases of fraud and forgery, handwriting is major medium though which a suspect can be questioned. Hence, handwriting

analysis plays a very important and major role in case of criminal cases.

The behavioural pattern of the person is predicted from the psychological traits like size, slant, pressure, baseline, number of breaks, margins, and speed of writing and spacing between the words of handwriting. The attributes like line separation, slant, character shapes, etc., which are used by forensic document examiners, were used to quantitatively establish individuality by using machine learning approaches [15]. The holistic approach to handwriting analysis deems to have diagnostic value and is promising in providing guidelines for psychotherapy [3].

II. MATERIALS AND METHODS

Handwriting samples of 50 Right-handed and 50 Left-handed individuals between the age group of 18-30 years were taken from the colleges of South Mumbai. The materials that were required to carry out the study were: pen, paper, magnifying glass, A4 Sheets, template, scale and a standard.

“Fig 1” shows Penn Scale Worry Questionnaire that was used for Worry Assessment. The scores were evaluated using the method given along with it. Handwriting analysis of Right-Handed and Left-Handed writers along with their worry assessment was carried out.

The PENN SCALE WORRY QUESTIONNAIRE is as give below -

QUESTIONNAIRE

NAME: _____ DATE: _____

Rate each of the following statements on a scale of 1 to 5. Please do not leave any items blank.

1 = Not at all typical of ME
 2 = Rarely typical of ME
 3 = Somewhat typical of ME
 4 = Often typical of Me
 5 = Very typical of ME

STATEMENTS

1. If I do not have enough time to do everything, I do not worry about it.
2. My worries overwhelm me.
3. I do not tend to worry about things.
4. Many situations make me worry.
5. I know I should not worry about things, but I just cannot help it
6. When I am under pressure I worry a lot.
7. I am always worrying about something.
8. I find it easy to dismiss worrisome thoughts
9. As soon as I finish one task, I start to worry about everything else I have to do.
10. I never worry about anything.
11. When there is nothing more I can do about a concern, I do not worry about it anymore.
12. I have been a worrier all my life.
13. I notice that I have been worrying about things.
14. Once I start worrying, I cannot stop.
15. I worry all the time.
16. I worry about projects until they are all done.

Figure 1. Penn Scale Worry Questionnaire

Characteristics Analysed In Handwriting

The handwriting samples were analyzed for the following characters:

- a. **Pen pressure:** The force with which the writer writes on a paper is Pen Pressure. It is determined by checking the indentation on the back of the paper. Pen pressure may be heavy, average or light.
- b. **Size of words:** The space in a line covered by words helps in determination of their size. It is measured by using scale and can be large, average or small.
- c. **Slant of words:** Deviation seen in words with respect to the imaginary line drawn perpendicular to the base line while writing in a rhythm is slanting of words. This is determined with the help of magnifying glass. The words may be tilted either left or right, but there is also a possibility that the words may have no slant.
- d. **Spacing between the words:** The gap between two words in a line is spacing between the words. This is determined by normal observation. The spacing may be either wide or narrow.
- e. **Shape of letters:** The formation of letters in line determines the Shape of Letters. Certain alphabets like ‘a’, ‘t’, ‘d’, etc., are studied to decide the shape. The shapes can be connected, rounded or pointed.
- f. **Page margins:** Space left before starting or ending the line while writing a line or paragraph is Page Margin. There may be either left margin or right margin. Some writers may write exactly in centre leaving equal left and right margin.

III. RESULTS AND DISCUSSION

- a. **Pen Pressure-** among Right-handed writers, 40% of the population writes with Light pressure, 35% with Average pressure and 25% with Heavy pressure. Whereas in case of Left-handed writers, 35% of the population writes with either Light pressure or Average pressure and the remaining 30% with Heavy pressure. 25% of the Right-handed (RH) writers and 30% of the Left-handed (LH) writers have lots of vitality and energy, 35% of the RH writers and 35% of LH writers have enough energy to make it through the day and lastly, 40% of RH writers and 35% of LH writers try to avoid energy draining situations.

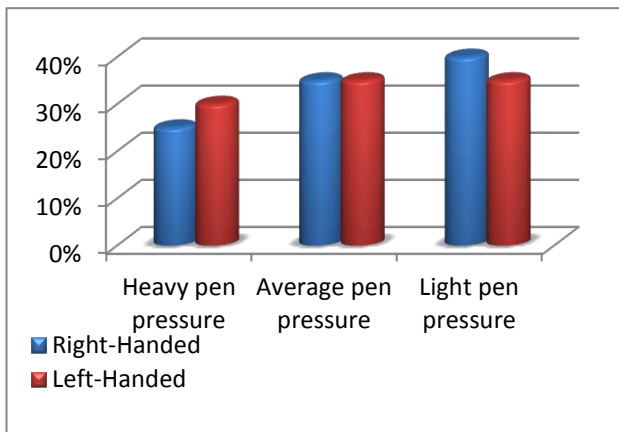


Figure 2. Chart showing comparison of Pen Pressure among Right-handed and Left-handed writers

b. Size of the Words- During analysis of the handwriting samples, it was seen that, 40% of the Right-handed writers write words of small size, 35% with average size and 25% with large size. But, in the case of Left-handed writers, 55% of the population, write words of small size, 25% with average size and 20% with words of large size.

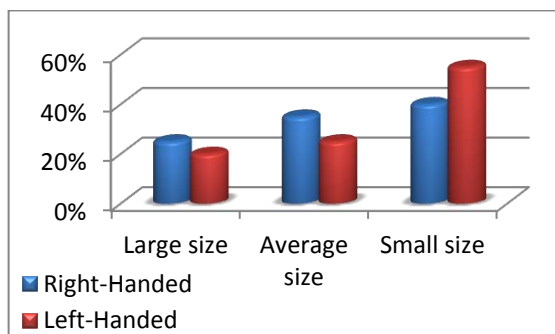


Figure 3. Chart showing comparison of Size of Letters among Right-handed and Left-handed writers

c. Slant of Words- 45% of the Right-handed writers write with no slant, while 35% and 25% write with Left slant and Right slant, respectively. Amongst Left-handed writers, half of the population i.e., 50% writers write with no slant, whereas 35% with Right slant and very small portion of 15% with Left slant. 35% of the Right-handed (RH) writers and 15% of the Left-handed (LH) writers are quiet, reclusive and usually think before acting, 20% of RH writers 35% of LH writers are assertive, confident and sometimes insensitive and finally, 45% of RH writers and 50% of LH writers are reliable, consistent but often very reserved and constrained.

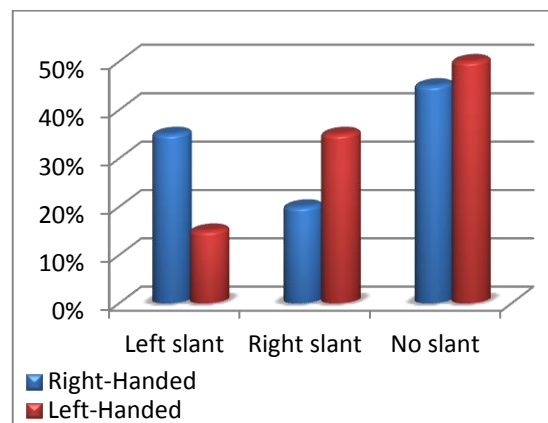


Figure 4. Chart showing comparison of Slant of Words among Right-handed and Left-handed writers

d. Spacing between the Words- Among the Right-handed writers, 60% of the population writes with narrow space between the words while 40% write with wide space. Correspondingly, 80% of the Left-handed writers write with narrow space between the words while merely 20% of the population writes with wide space. 40% of the Right-handed (RH) writers and 20% of the Left-handed (LH) writers enjoy freedom and don't like to be overwhelmed or crowded and 60% of RH writers and 80% of LH writers can't stand to be alone, tend to crowd people and be intrusive.

e.

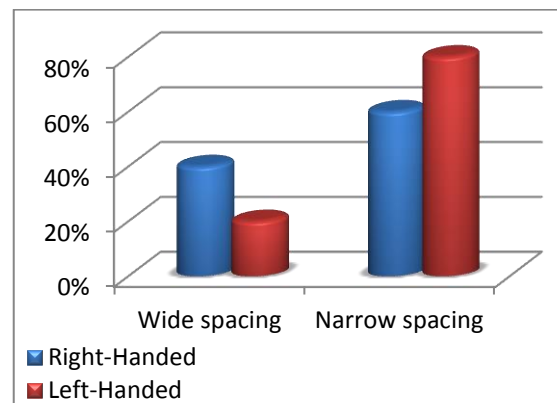


Figure 5. Chart showing comparison of Spacing between the words among Right-handed and Left-handed writers

f. Shapes of Letters- 55% of Right-handed writers have pointed letters, 35% have connected letters and only 10% have rounded letters in their handwriting. Similarly, among Left-handed population, 40% have pointed letters and, other 40% have connected letters while 20% have rounded letters in their handwriting. 35% of the Right-handed (RH) writers and 40% of the Left-handed (LH) writers are logical, systematic

and make decisions carefully, 55% of RH writers and 40% of LH writers are aggressive, intense, very intelligent and curious and lastly, 10% of RH writers and 20% of LH writers are creative and artistic. 25% of the Right-handed (RH) writers and 20% of the Left-handed (LH) writers are outgoing, people-oriented, outspoken and love attention, 35% of RH writers and 25% of LH writers are well-adjusted and acceptable and finally, 40% of RH writers and 55% of LH writers are shy/withdrawn, studious, concentrated and meticulous.

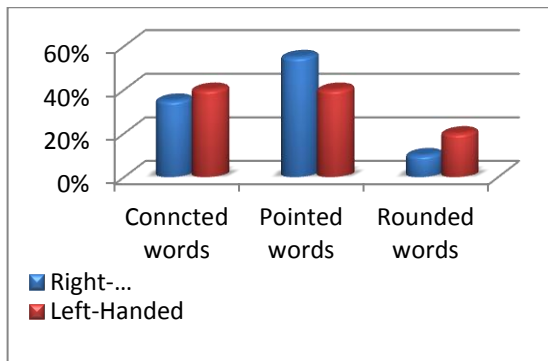


Figure 6. Chart showing comparison of Shape of Letters among Right-handed and Left-handed writers

g. Page Margins- in the Right-handed writers, 80% of the population leave Left page margin while writing and 20% population write in the Centre. But, among the Left-handed population, 60% leave Left page margin, 30% write in the Centre and 10% leave Right page margin while writing. 80% of the Right-handed (RH) writers and 60% of the Left-handed (LH) writers tend to live in the past and have a hard time letting go of things, 20% of RH writers and 30% of LH writers are well-organized and stable, and make clear decisions and lastly, 10% of LH writers fear the unknown and constantly worry about the future.

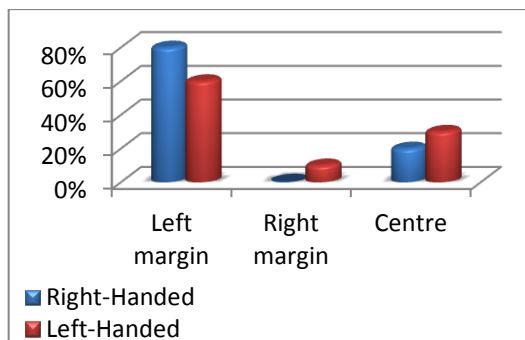


Figure 7. Chart showing comparison of Page Margins among Right-handed and Left-handed writers

WORRY ASSESSMENT

The scoring of PSWQ is done with respect to the response given to the particular statement (Figure 1). The response is given from the scale of 1-5 ranging from 'Not at all typical of me to' to 'Very typical of me'. Response depends upon whether the statement is worded positively or negatively. Total score of the scale ranges from 16-80.

Statement numbers- 1, 3,8,10 and 11 are scored reversely because of negative wording.

Statement numbers- 2, 4,5,6,7,9,12,13,14,15 and 16 are scored normally.

Total scale range of Worry Assessment is as follows:
16-39 – Low Worry; 40-59 – Moderate Worry; 60-80 – High Worry

INTERPRETATION

30% of the Right-handed writers and 25% of the Left-handed writers fall under Low Worry range. 55% of the Right-handed writers and 65% of the Left-handed writers fall under Average Worry range. 15% of the Right-handed writers and 10% of the Left-handed writers fall under High Worry range.

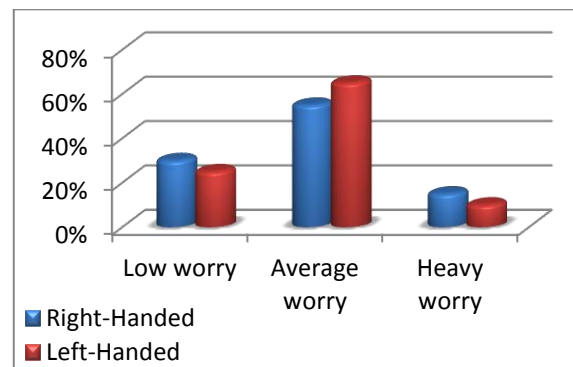


Figure 8. Chart showing comparison of Worry Assessment among Right-handed and Left-handed writers

IV. CONCLUSION

'Handwriting Analysis of Right-Handed and Left-Handed Writers Along With Their Worry Assessment' was carried out and the characteristics of the Right-Handed and Left-Handed writers were studied in order to understand their personality. All these characteristics

of the Right-handed writers were compared with the characteristics of the Left-handed writers.

It was found that certain characters like slant of words, spacing between the words, shape of letters and page margin showed significant difference between the right-handed and left-handed writers. However, characters like pen pressure, size of words and Worry Assessment did not show any significant difference although, more accurate results can be obtained if the study population is increased. Thus, it can be concluded that the personality traits of the Right-Handed and Left-Handed writers does not reveal much difference's. Also, the belief that the Left-Handed writers are much different than the Right-Handed writers is proved to be false.

V. ACKNOWLEDGEMENTS

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VI. REFERENCES

- [1]. Borkovec, TD, & Inz, Jonathan. (1990). The nature of worry in generalized anxiety disorder: A predominance of thought activity. *Behaviour research and therapy*, 28(2), 153-158.
- [2]. Chorpita, Bruce F, Tracey, Susan A, Brown, Timothy A, Collica, Tracy J, & Barlow, David H. (1997). Assessment of worry in children and adolescents: An adaptation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, 35(6), 569-581.
- [3]. Cronjé, Johannes C. (2009). Qualitative Assessment across Language Barriers: An Action Research Study. *Educational Technology & Society*, 12(2), 69-85.
- [4]. Davey, Graham CL, & Tallis, Frank Ed. (1994). *Worrying: Perspectives on theory, assessment and treatment*: John Wiley & Sons.
- [5]. Dazzi, Carla, & Pedrabissi, Luigi. (2009). Graphology and personality: an empirical study on validity of handwriting analysis. *Psychological reports*, 105(3_suppl), 1255-1268.
- [6]. Denier, JJ, & Thuring, J Ph. (1965). The guiding of human writing movements. *Biological Cybernetics*, 2(4), 145-148.
- [7]. Hagan, Patti. (1976). Johnny not only can't write: he can't handwrite, either. *NY Times Sunday Magazine*, May, 23, 64.
- [8]. Hall, Calvin S, & Lindzey, Gardner. (1957). *Theories of personality*.
- [9]. Hollerbach, John M. (1981). An oscillation theory of handwriting. *Biological Cybernetics*, 39(2), 139-156.
- [10]. Hilton, Julian. (1982). *Georg Büchner*: Macmillan.
- [11]. Huber, Roy A, & Headrick, Alfred M. (1999). *Handwriting identification: facts and fundamentals*: CRC press Boca Raton
- [12]. Jones, Dian, & Christensen, Carol A. (1999). Relationship between automaticity in handwriting and students' ability to generate written text. *Journal of educational psychology*, 91(1), 44.
- [13]. Lewis, Jane. (2014). *Forensic document examination: Fundamentals and current trends*: Elsevier.
- [14]. Molina, Silvia, & Borkovec, Thomas D. (1994). The Penn State Worry Questionnaire: Psychometric properties and associated characteristics.
- [15]. Said, Huwida ES, Tan, Tienniu N, & Baker, Keith D. (2000). Personal identification based on handwriting. *Pattern Recognition*, 33(1), 149-160.
- [16]. Srihari, Sargur N, Cha, Sung-Hyuk, Arora, Hina, & Lee, Sangjik. (2002). Individuality of handwriting. *Journal of forensic science*, 47(4), 1-17.
- [17]. Tang, Thomas Li-Ping. (2012). Detecting Honest People's Lies in Handwriting. *Journal of Business Ethics*, 106(4), 389-400.
- [18]. Van Galen, Gerard P. (1991). Handwriting: Issues for a psychomotor theory. *Human movement science*, 10(2), 165-191.
- [19]. Xu, Lei, Krzyzak, Adam, & Suen, Ching Y. (1992). Methods of combining multiple classifiers and their applications to handwriting recognition. *IEEE Transactions on systems, man, and cybernetics*, 22(3), 418-435.

Anxiety as a causal factor in the development of phobias

Mrs. Bhagyashree Kulkarni^{1*}, Miss. Riddhi Rane², Miss. Shruti Pawar³

ABSTRACT

A Phobia is a type of anxiety disorder defined by a persistent and excessive fear of an object or situation. Phobia typically results in a rapid onset of fear and is present for more than six months. The affected person goes to great lengths to avoid the situation or object, to a degree greater than the actual danger posed. The American Psychological Association (APA) defines anxiety as “an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure”. The current study is pilot research work based on case study and survey method. It studies the relationship between anxiety and phobia and how anxiety is the causal factor in the development of phobia in the age group between 18 to 25 years in Mumbai city. The survey was conducted with the help of a questionnaire. Under the guidance of the Author “Smt. Bhagyashree Kulkarni”, the co-authors “Miss. Riddhi Rane” and “Miss. Shruti Pawar” observed that 15% individuals possessed higher anxiety levels, 63% were individuals having moderate anxiety levels and 22% were individuals having lower anxiety levels. Whereas, in the second part of the test i.e. the test for phobia, 12% samples showed severe phobia which indicates that these individuals have a fear of any object or any situation which is so intense that it can have a negative impact on their daily life, 60% samples showed mild phobia which means they have a specific phobia of a specific object or situation that usually poses little or no actual danger. And 28% samples showed no phobia.

Keywords: *Eritrean counseling, counseling approa*

Anxiety is a mood state characterized by worry, apprehension, and somatic symptoms. Similar to the tension caused when an individual anticipates impending danger, catastrophe, or misfortune. The threat the person is responding to may be real or imagined or internal or external. It may be an identifiable (cued) situation or a vaguer fear of the unknown (uncued). The body often mobilizes itself to meet the threat, whether this is real or imagined: Muscles become tense, breathing becomes faster, and the heart beats more rapidly. Anxiety may be distinguished from real fear both conceptually and physiologically, although the two terms are often mistakenly used interchangeably in everyday language.

¹HOD and Assistant Professor- Department of Forensic Psychology, Institute of Forensic Science, Mumbai, Maharashtra, India

²S.Y.BSc Student-Institute of Forensic Science, Mumbai, Maharashtra, India

³S.Y.BSc Student-Institute of Forensic Science, Mumbai, Maharashtra, India

*Responding Author

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Anxiety as a Causal Factor in the Development of Phobias

The term anxiety refers to feelings of worry, nervousness, apprehension, or fear commonly experienced by people when faced with something they view as challenging – a test, speaking in public, performing in public, a job interview, divorce, layoff, or any number of other stress-inducing events. Sometimes anxiety is characterized by vague, unsettling feelings of nervousness and apprehension, often with the person having no idea what he or she is anxious about. Anxiety is an adaptive way to cope with the various stressors and challenges in the world. It's short-lived and doesn't have a dramatic effect on your life. However, when anxious feelings, like worry and fear, begin to interfere with daily life on a regular basis, seem unreasonable and excessive, or have no apparent association with any external stimuli or stresses, it can become an anxiety disorder.

When we encounter a difficult situation, it is natural to feel uneasy. For example, imagine the case of a student who is about to face an examination. The results of this exam can have a huge impact on the future career avenues of the student. It is only to be expected that the student would feel anxious. Not only this, when facing an interview, when speaking in public, waiting for an important piece of news, we all feel anxious and worried. However, there are situations where anxiety becomes overwhelming and out of proportion to circumstances. This kind of anxiety is considered as an anxiety disorder. In such a situation, the anxiety is out of proportion to the actual danger.

Phobia is a type of anxiety disorder that describes an excessive and irrational fear of a specific object, activity, or situation. Phobias involve intense fear surrounding an object or situation that realistically poses little or no real danger. They are different from common fears in that the associated anxiety is so strong it interferes with daily life and the ability to function normally. People suffering from phobias may go to extreme lengths to avoid encountering or experiencing the feared object or situation. Though many people with phobias realize that their worry is unrealistic or unwarranted, feelings of fear and anxiety persist and seem unmanageable, leaving sufferers feeling out of control.

Phobias themselves can be divided into three specific types:

1. Specific phobias (formerly called "simple phobias")
2. Social phobia (also called "social anxiety disorder")
3. Agoraphobia

Specific phobias

As its name suggests, a specific phobia is the fear of a particular situation or object, including anything from airplane travel to dentists. Specific phobias seem to run in families and are roughly twice as likely to appear in women. If the person rarely encounters the feared object, the phobia does not cause much harm. However, if the feared object or situation is common, it can seriously disrupt everyday life. Common examples of specific phobias, which can begin at any age, include fear of snakes, flying, dog, escalators, elevators, high places, or open spaces.

Social phobia

People with social phobia have deep fears of being watched or judged by others and being embarrassed in public. This may extend to a general fear of social situations—or be more specific or circumscribed, such as a fear of giving speeches or of performing (stage fright). More rarely, people with social phobia may have trouble using a public restroom, eating in a restaurant, or signing their name in front of others. Social phobia is not the same as shyness. Shy people may feel uncomfortable with others, but they don't experience severe anxiety, they don't worry excessively about social situations beforehand, and they don't avoid events

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that make them feel self-conscious. On the other hand, people with social phobia may not be shy—they may feel perfectly comfortable with people except in specific situations. Social phobias may be only mildly irritating, or they may significantly interfere with daily life. It is not unusual for people with social phobia to turn down job offers or avoid relationships because of their fears.

Agoraphobia

Agoraphobia is the intense fear of feeling trapped and having a panic attack in a public place. It usually begins between ages 15 and 35, and affects three times as many women as men—about 3% of the population. An episode of spontaneous panic is usually the initial trigger for the development of agoraphobia. After an initial panic attack, the person becomes afraid of experiencing a second one. Patients literally "fear the fear," and worry incessantly about when and where the next attack may occur. As they begin to avoid the places or situations in which the panic attack occurred, their fear generalizes. Eventually the person completely avoids public places. In severe cases, people with agoraphobia can no longer leave their homes for fear of experiencing a panic attack.

These irrational fears can interfere with personal relationships, work, and school, and prevent you from enjoying life.

Sigmund Freud is popularly known as the father of modern psychology. His pioneering structural theory was largely based on the three stages of conscience:

1. Id
2. Ego
3. Superego

The id is the most primal and instinctive part of the mind and is the basis of such primitive emotions as fear and anxiety. The superego is the selfless higher conscience, adding value judgments and the concept of guilt. The ego is the rational moderator between the two. A significant portion of the ego's duty is to control the impulses of the id.

According to this theory, phobias are based on anxiety reactions of the id that have been repressed by the ego. In other words, the currently feared object is not the original subject of the fear.

Hypotheses

The current study is aimed to find out that anxiety is a causal factor in the development of phobias in an individual.

METHODOLOGY

This plot search is carried out using survey method and case studies. A questionnaire is created. It consists of two tests Authored by "Smt. Bhagyashree Kulkarni" and co-authored by "Miss. Riddhi Rane" and "Miss. Shruti Pawar". The two tests are named as - 1. Test on Anxiety and 2. Test on Phobias. Test on Anxiety is a, 25 items test that measures the extent of anxiety of the individuals in Mumbai city, Maharashtra population. The statements of the questionnaire were collected by reviewing various situations observed in daily life, in literatures and surveys. Along with this, Test on Phobia which consists of 20 items and measures the level of fear of phobia of an individual was also used. The Test on Phobia, is an attempt to understand if it is developed because of intense anxiousness or whether anxiety is

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the causal factor in the development of phobia. These two questionnaires were administered on total of 200 individuals belonging to the age group of 18-25.

Questionnaires:

1. Test on Anxiety

Instructions: “This test consists of 25 sentences. The response should be given such that (1: always, 2: frequently, 3: sometimes, 4: never). There is no time limit to complete the test, however complete the test as soon as possible. There are no right or wrong responses.” (*Test questions at Appendix-1*)

2. Test on Phobias

Instructions: “This test consists of 20 questions. The answers should be marked such that (Yes: +1 /No: 0). There is no time limit to complete the test, however complete the test as soon as possible. There are no right or wrong responses.” (*Test questions at Appendix-1*)

Case Studies:

1) Mike’s social anxiety disorder

Mike, a 20-years-old reports that he feels depressed and experiences a significant amount of stress about school. He spends much of his day in his dorm room playing video games and has a hard time identifying what, if anything, is enjoyable in a typical day. He rarely attends class and has avoided reaching out to his professors. Mike was shy and has had a very small and cohesive group of friends. Notably, his level of stress significantly amplified when he began college. He had a hard time interacting with others because he was busy worrying about what they will think of him, he assumed they will find him “dumb,” “boring,” or a “loser”. When he loses his concentration, he stutters, is at a loss for words, and starts to sweat, which only serves to make him feel more uneasy. After the interaction, he overthinks focusing on the “stupid” things he said. Similarly, he was uncomfortable with authority figures and approaching teachers. Since starting college, he has been isolating more, turning down invitations from his roommate to go eat or hang out, ignoring his cell phone when it rings, and habitually skipping class. He had social anxiety disorder, which was the primary treatment target. He also had a fear of negative evaluation, and his thoughts and behaviors surrounding social situations, as driving his increasing sense of hopelessness, isolation, and worthlessness.

2) Intense fear of falling and dying.

The Patient Mrs. E.L had intense fear of falling and dying, along with fears of losing consciousness. She had been home bound for the last 17 years. She had a fear that something bad will happen, if she will go out of her apartment. She stayed mostly in her bed, and did not even allow her husband to leave the apartment. She believed, that she might get hurt or buried alive if she leaves the safety of her bed. The patient was quite fearful of dying, thinking she may go to hell, although she could not describe anything that would make her deserve that fate. Her niece reported that in the 1950s, when the patient’s husband was working, she couldn’t tolerate being home alone. It was unclear if the patient met the criteria for Panic disorder; however, her niece also reported she may sometimes have panic like symptoms. These include shortness of breath; tightness in her chest; palpitation; sweaty hands; tremors and sudden jolts of fear of dying. Her brother would pick her up and she would stay all day with his family until her husband returned from work to pick her up at the same time every day. Over the years, her condition worsened to a point where she even refused to step out of her apartment. As the time progressed, so did her agoraphobia, eventually forcing her to be

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confined to the corners of her bed. She was then provided with services such as a bedpan and sponge baths.

3) Fear of aging (anxiety in the past being the cause of phobia)

We present the clinical case of a 14-years-old boy with Gerascophobia or an excessive fear of aging, who felt his body development as a threat, to the point where he took extreme measures to stop or otherwise hide growth. He had a history of separation anxiety, sexual abuse, and suffering bullying. He presented with anxious and depressive symptoms and food restriction, criticized his body image, had negative feelings towards the maturation process, suffered at the thought of being rejected, and was preoccupied with certain physical characteristics. We conducted an analysis of biological, psychological, and environmental factors and their possible interactions and established treatment with psychotherapy and fluoxetine. Because of the favorable results, this approach could be considered a good option in such cases.

4) Peter suffering social phobia (phobia developed because of parents suffering from depressive episodes).

Master Peter, a 12 years old student of 7th standard, presented with chief complaints of poor socialization. The patient's mother had suffered from a depressive episode during the antenatal period. He achieved developmental milestones at appropriate ages and managed average grades at school. The patient was noted to cry when anybody other than his parents tried to hold him even when he was about 3-4 months old. Later, it was noted that he expressed his needs only to and made eye contact only with his parents. He appeared distressed in social situations, where he never initiated conversation and responded to questions only on coaxing (and in a low volume). He played and interacted with his peers only in the presence of his parents. He would not go to the market on his own because of anxiety in facing shopkeepers. At school, he would not answer questions verbally because of fear of making mistakes and he was overtly anxious before and during exams. He was particularly shy of girls. He was a fussy eater, e.g. he ate only when the food was cold. His conversation was limited to discussions on cartoon characters like He-man, GI Joe etc. While playing with such toys he would converse with them and treat them as living things. Parents also reported that he did not reciprocate the non-verbal expressions of others. There was no history of self-injurious behavior, deterioration of acquired skills, perceptual abnormalities, sustained mood change, free floating anxiety, agoraphobia, articulation difficulties, speech delay, head injury, fever or seizures. His physical examination was unremarkable. On mental status examination, he was noted to avoid eye contact and appeared anxious. His IQ was 91. A diagnosis of Asperger's syndrome was made according to ICD-10 in view of the marked abnormality in social interaction, and stereotyped, repetitive repertoire of interest and activities, and the absence of developmental delay.

DISCUSSION

Anxiety is a mood state characterized by worry, apprehension, and somatic symptoms. Similar to the tension caused when an individual anticipates impending danger, catastrophe, or misfortune. The threat the person is responding to may be real or imagined or internal or external. It may be an identifiable (cued) situation or a vaguer fear of the unknown (uncued). The body often mobilizes itself to meet the threat, whether this is real or imagined: Muscles become tense, breathing becomes faster, and the heart beats more rapidly.

Phobia is a type of anxiety disorder that describes an excessive and irrational fear of a specific object, activity, or situation. Phobia is the emotional response to real or perceived

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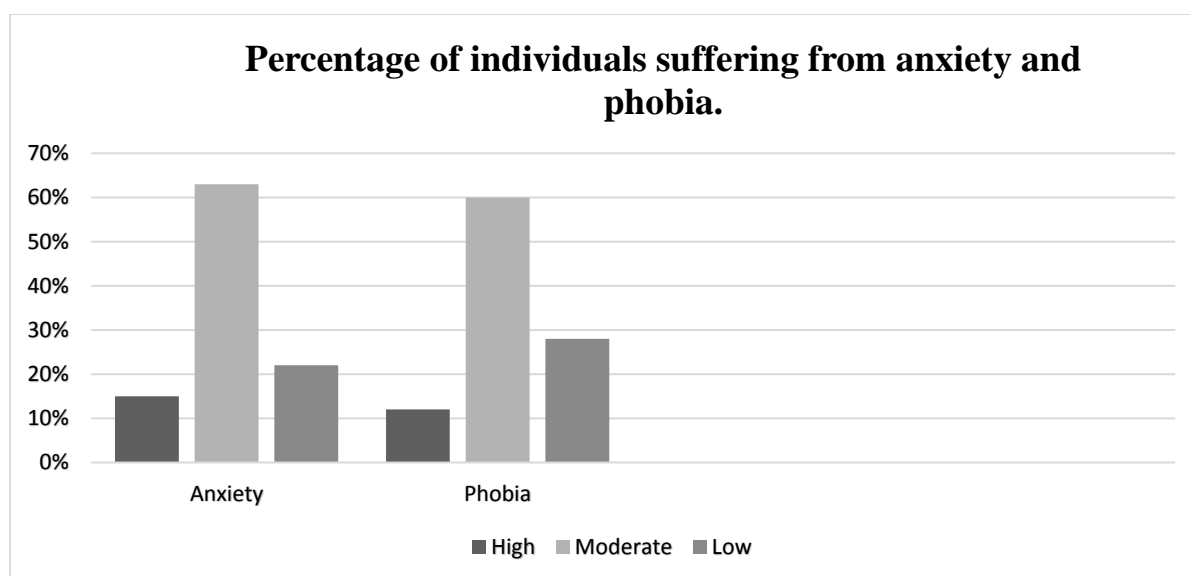
imminent threat. Phobias involve intense fear surrounding an object or situation that realistically poses little or no real danger. They are different from common fears in that the associated anxiety is so strong it interferes with daily life and the ability to function normally. **Specific Phobia:** Depending on what your phobia is, you might find it a real struggle to run errands, go out with friends, or even make it to work every day. In other words, a specific phobia can significantly impair your education, your career, and your overall quality of life. Specific or simple phobias, such as a fear of heights (acrophobia), usually develop during childhood. They can often be linked to an early negative childhood experience. For example, if you're trapped in a confined space when you're young, you may develop a fear of enclosed spaces (claustrophobia) when you're older. It's also thought that phobias can sometimes be "learnt" from an early age. For example, if someone in your family has a fear of spiders (arachnophobia), you may also develop the same fear yourself.

Social Phobia: It's normal to feel nervous in some social situations. But in social anxiety disorder, also called social phobia, everyday interactions cause significant anxiety, fear, self-consciousness and embarrassment because you fear being scrutinized or judged by others. In social phobia, fear and anxiety lead to avoidance that can disrupt your life. Severe social phobia can affect your daily routine, work, school or other activities. Other factors in the family environment, such as having parents who are particularly anxious, may also affect the way you deal with anxiety later in life. They're often linked to a frightening event or stressful situation. However, it's not always clear why some phobias occur.

Anxiety is anticipation of future threat. Anxiety, involves becoming nervous even before being in certain situations or coming into contact with the object of your phobia; for example, a person with a fear of dogs may become anxious about going for a walk because he or she may see a dog along the way. Whereas, long-term stress can cause feelings of anxiety, and reduce your ability to cope in particular situations. This can make you feel more fearful or anxious about being in those situations again and, over a long period, could lead to you developing a phobia.

To prove that anxiety is a causal factor in the development of phobias in an individual a questionnaire is created. It consists of two tests Authored by "*Smt. Bhagyashree Kulkarni*" and co-authored by "*Miss. Riddhi Rane*" and "*Miss. Shruti Pawar*". The two tests are named as - 1. Test on Anxiety and 2. Test on Phobias. In the Test on Anxiety 25 questions are designed as per various situations an individual, faces in their daily life. The questions are to be answered as per the four options given and the scoring is such that: +1: always, +2: frequently, +3: sometimes, +4: never. Whereas the second part that is, Test on Phobias, it contains 20 questions. The questions are basic and also situation based. The questions are expected to be answered in a Yes or No manner and the scoring is such that: Yes: +1 /No: 0. Direct proportionality is observed between anxiety and phobia in the age group 18-25 in Mumbai city (as plotted in the Graph no. 1). 15% individuals were possessing higher anxiety levels, 63% were individuals having moderate anxiety levels and 22% were individuals having lower anxiety levels. Whereas, in the second part of the test i.e. the test for phobia, 12% samples showed severe phobia which indicates that these individuals have a fear of any object or any situation which is so intense that it can have a negative impact on their daily life, 60% samples showed mild phobia which means they have a specific phobia of a specific object or situation that usually poses little or no actual danger. And 28% samples showed no phobia.

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Graph no. 1: Percentage of individuals of age group 18-25 in Mumbai city suffering anxiety and phobias.

As per the data collected and the results of the survey done in Mumbai city, a very low number of individuals show both, higher anxiety levels and severe phobia i.e. only 13%. These individuals are the ones who struggle with intense anxiousness or anxiety disorders which ends up developing a fear of any object or situation. When exposed to that object or situation it brings about an immediate reaction, it causes the person to endure intense anxiety (nervousness) or to avoid the object or situation entirely. This results in the development of severe phobia in that individual. Also 35% of individuals had moderate anxiety with mild phobia. These individuals struggle from specific phobia, formerly called simple phobia, it is a lasting and unreasonable fear caused by the presence or thought of an object or situation that usually poses little or no actual danger. Therapy is aimed at reducing fear and anxiety symptoms and helping people manage their reactions to the object of their phobia.

CONCLUSION

Through this survey, it can be concluded that anxiety is a causal factor in the development of phobias. The outcome of this research indicates that people who are intensely anxious or have anxiety disorders develop severe phobias of any objects or situations.

REFERENCES

1. <https://www.psychom.net/anxiety-specific-phobias/>
2. <https://www.webmd.com/anxiety-panic/specific-phobias#1>
3. <https://www.webmd.com/anxiety-panic/features/mind-matters-anxiety>
4. <https://www.medicalnewstoday.com/articles/249347>
5. <https://www.anxiety.org/phobias>
6. <https://www.anxiety.org/social-anxiety-disorder-sad>
7. <https://www.healthyplace.com/anxiety-panic/anxiety-disorders/what-causes-anxiety-disorders-to-develop>

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Conflict of Interest

The author declared no conflict of interest.

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Appendix -1

Questionnaires:

1. Test on Anxiety

Instructions: “This test consists of 25 sentences. The response should be given such that (**1: always, 2: frequently, 3: sometimes, 4: never**). There is no time limit to complete the test, however complete the test as soon as possible. There are no right or wrong responses.”

AGE:_____ **GENDER:**_____ **OCCUPATION:**_____

1. I worry if I make a fool of myself, or I have been made to look foolish.
2. I hesitate or get nervous if I have to speak or perform in front of a group of strangers.
3. I keep in background on social occasions.
4. I have changes of mood that I cannot explain.
5. I feel uncomfortable when I meet new people.
6. I day-dream, also I indulge in fantasies not involving concrete situations.
7. I get discouraged easily, by failure or criticism.
8. I say things in haste and regret them.
9. I have a feeling hopelessness and unworthiness.
10. I am self-conscious before ‘superiors’ (teachers, employers).
11. I have a sense of isolation, either when alone or among people.
12. I lack confidence in my general ability to do things and to cope with situations.
13. I am self-conscious about my appearance even when I am well-dressed or groomed.
14. I feel that other people are better than me.
15. I tend to focus on upsetting situations or events happening in my life.
16. I often have diarrhea, constipation or other digestive problems.
17. When someone snaps me, I spend the rest of the day thinking about it.
18. I find difficulty in falling asleep or waking.
19. No matter what I do I can’t take my mind off from certain concerns in my life.
20. I worry and am unable to relax in stressful situations.
21. It bothers me to have people watch me work, even when I am doing it well.
22. I feel so upset that nothing can cheer me up.
23. I don’t see people or situations motivating me.
24. I hesitate to ask for help from someone.
25. I often blame myself for the negative situations that I haven’t created.

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2. Test on Phobias

Instructions: “This test consists of 20 questions. The answers should be marked such that (Yes: +1 /No: 0). There is no time limit to complete the test, however complete the test as soon as possible. There are no right or wrong responses.”

AGE: _____ GENDER: _____ OCCUPATION: _____

1. Do you know what is a phobia?
2. Do you have any sort of fear/phobia of a person, thing, animal, or a situation? (It can be a small or a large fear)
3. Did you learn about your fear/phobia through television, books, radio, internet or a relative/friend?
4. Do you try to cope with your fear/phobia?
5. Does your fear/phobia affect your daily life?
6. Do you feel upset about having a fear/phobia?
7. Does your fear/phobia make you mentally uncomfortable?
8. Do you think a lot about your fear/phobia?
9. Do you feel sweaty, chills, shivers, increased heart rate, etc. when you face your fear/phobia?
10. Have you experienced sleepless nights because of your fear/phobia?
11. Do you panic or have a panic attack when you face your fear/phobia?
12. Do you avoid facing your fear/phobia?
13. Have you told anyone or does anybody know about your fear/phobia?
14. Have you ever had a very bad experience with your fear/phobia?
15. Does having a bad experience make you excessively worry about your fear/phobia?
16. Does your fear/phobia only get triggered when you face it?
17. Have you felt embarrassment in the society because of your fear/phobia?
18. Have you tried to seek help from others to cope up from your fear/phobia?
19. Do you try to tell your family/friends/relatives about your fear/phobia?
20. Have you experienced visual or auditory hallucinations when in fear/phobia?

Painkillers: necessity or habit

Mrs. Bhagyashree Kulkarni^{1*}, Miss. Aloma Castelino², Miss. Sanchita Aher³,
Miss. Tripti Singh⁴

ABSTRACT

Painkiller, an analgesic drug, relieves pain and has become addiction for some individuals, giving rise to other side effects. To explain these effects of consumption of painkillers due to work pressure and physical dependence as a necessity or a habit in the age group, 30-55 years in men and women of City (Mumbai) and Village (Junnar), a pilot research work based on Case Study and Survey Method (i.e. projective test) was conducted. After studying this work and calculating the scores, effects were compared by differentiating it into high score indicating less addiction and low score as more addiction towards painkillers. The subjects from city have low tolerance towards pain due to daily lifestyle leading into habit formation as they had high scores; whereas by avoiding painkillers, the rural settlement hold high tolerance towards pain. It was observed that, city people have lack of confidence to continue working without painkillers and also were marked with side-effects on their body; whereas village individuals neglected the pain and worked effectively. This concluded that, more addiction towards painkillers of individuals from city perspective than individuals from rural settlements. It was found from the survey that there is a great need of awareness amongst people from city places to avoid the usage of painkillers on regular basis and indulge them into the usage of home remedies and increase their tolerance level towards bearing pain by showing them this comparative study between the difference observed in the city places and rural area.

Keywords: *Painkiller, Addiction, Work pressure, Physical Dependence, Habit formation, Tolerance*

Painkiller is “an agent, such as an analgesic drug, that relieves pain and has now become an addiction for some individuals giving rise to other side effects”. The current study is a pilot research work aimed to compare effects of consumption of painkillers due to work pressure and physical dependence based on Case Study & Survey Method (i.e., projective test). A projective test is a personality test designed to let a person

¹HOD and Assistant Professor – Department of Forensic Psychology, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

²S.Y. BSc Student, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

³S.Y. BSc Student, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

⁴S.Y. BSc Student, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

*Responding Author

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respond to ambiguous stimuli. A **projective test** reveals hidden emotions and internal conflicts projected by the person into the test. Other examples of projective tests: Rorschach Inkblot Test, Thematic Apperception Test, Draw-A-Person Test, House-Tree-Person Test. The applications of projective techniques are mainly used in forensic psychology and clinical assessment of children. Also, owing to the mental capability, children may not be able to express freely, nor answer to complicated questions or questionnaires, hence they are also useful in investigation of abuse cases. The word personality originates from the Latin word “persona”, which means “mask”. This term was coined by Swiss psychiatrist Carl Jung, in the year 1905 – 1910. “Personality” is a dynamic and organized set of characteristics possessed by a person that uniquely influences their environment, cognition, emotions, motivations and behaviours in various situations. Personality also predicts human reactions to other people, problems and stress. Gordon Allport, the Father of Personality Psychology, was one of the first psychologists to study personality.

LITERATURE REVIEW FOR PERSONALITY

The following are some of the personality theories:

Psychoanalytical theory: Psychoanalytic theories explain human behavior in terms of the interaction of various components of personality. Sigmund Freud drew on the physics of his day (thermodynamics) to coin the term psychodynamics. Freud's theory places central importance on dynamic, unconscious psychological conflicts. **Social cognitive theory:** In cognitive theory, behavior is explained as guided by cognitions (e.g., expectations) about the world, especially those about other people. Cognitive theories are theories of personality that emphasize cognitive processes, such as thinking and judging. Albert Bandura, a social learning theorist suggested the forces of memory and emotions worked in conjunction with environmental influences. **Behaviorist theory:** Behaviorists explain personality in terms of the effects external stimuli have on behavior. The approaches used to analyze the behavioral aspect of personality are known as behavioral theories or learning-conditioning theories. According to this theory, people's behavior is formed by processes such as operant conditioning. Skinner put forward a "three term contingency model" which helped promote analysis of behavior based on the "Stimulus - Response - Consequence Model" in which it is questioned that under which circumstances or antecedent 'stimuli' does the organism engage in a particular behavior or 'response', which in turn produces a particular 'consequence'. **Humanistic theory:** Humanistic theory emphasizes that people have free will and that this plays an active role in determining how they behave. Accordingly, humanistic theory the focus is on subjective experiences of persons as opposed to forced, definitive factors that determine behavior. **Biopsychological theory:** The biopsychological theory of personality is a model of the general biological processes relevant for human psychology, behavior, and personality. This theory was proposed by research psychologist Jeffrey Alan Gray in 1970. Personality can be determined through a variety of tests. There are two major types of personality tests, projective and objective. Examples of such tests are the: Big Five Inventory (BFI), Minnesota Multiphase Personality Inventory (MMPI-2), Rorschach Inkblot test, Neurotic Personality Questionnaire KON-2006, or Eysenck's Personality Questionnaire (EPQ-R).

Literature review for painkillers

An **analgesic** or painkiller is any member of the group of drugs used to achieve analgesia, relief from pain. Analgesic drugs act in various ways on the peripheral and central nervous systems. **Opiates**, originally derived from the opium poppy, have been used for thousands of years for both recreational and medicinal purposes. The most active substance in opium is morphine—named after Morpheus, the Greek god of dreams. Morphine is a very powerful

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painkiller, but it is also very addictive. **Morphine** was first extracted from opium in a pure form in the early nineteenth century. **Codeine**, a less powerful drug that is found in opium but can be synthesized. The synthetic (man-made) opiates which mimic (imitate) the body's own painkillers are Methadone, Vicodin, OxyContin, Percocet.

The different types of painkillers are:

Non-opioid painkillers: Paracetamol, also known as acetaminophen or APAP, is a medication used to treat pain and fever. It is typically used for mild to moderate pain. In combination with opioid pain medication, paracetamol is now used for more severe pain such as cancer pain and after surgery. It is typically used either by mouth or rectally but is also available intravenously. Effects last between two and four hours. Paracetamol is classified as a mild analgesic. Paracetamol is generally safe at recommended doses.

Compound Painkillers: Analgesics are frequently used in combination, like opioid painkillers and non-opioid such as the paracetamol and codeine preparations found in many non-prescription pain relievers. While the use of paracetamol, aspirin, ibuprofen, naproxen, and other NSAIDs concurrently with weak to mid-range opiates (up to about the hydrocodone level) has been said to show beneficial synergistic effects by combatting pain at multiple sites of action, several combination analgesic products have been shown to have few efficacy benefits when compared to similar doses of their individual components.

NSAIDs: Nonsteroidal anti-inflammatory drugs (usually abbreviated to NSAIDs), are a drug class that groups together drugs that decrease pain and lower fever, and, in higher doses decrease inflammation. The most prominent members of this group of drugs, aspirin, ibuprofen and naproxen, are all available over the counter in most countries.

Opioid painkillers: Morphine, the archetypal opioid, and other opioids (e.g., codeine, oxycodone, hydrocodone, dihydromorphine, pethidine) all exert a similar influence on the cerebral opioid receptor system. Opioids, while very effective analgesics, may have some unpleasant side-effects. When used appropriately, opioids and other central analgesics are safe and effective; however, risks such as addiction and the body's becoming used to the drug (tolerance) can occur.

Alcohol: Alcohol has biological, mental, and social effects which influence the consequences of using alcohol for pain. Moderate use of alcohol can lessen certain types of pain in certain circumstances. Attempting to use alcohol to treat pain has also been observed to lead to negative outcomes including excessive drinking and alcohol use disorder.

Cannabis: Medical cannabis, or medical marijuana, refers to cannabis or its cannabinoids used to treat disease or improve symptoms. There is evidence suggesting that cannabis can be used to treat chronic pain and muscle spasms, with some trials indicating improved relief of neuropathic pain over opioids.

The advantages of painkillers for most individuals are that, over-the-counter NSAIDs are used in the treatment of many different kinds of pain, including headaches, period pain and toothache. This kind of use is both appropriate and safe. Topical analgesia is generally recommended to avoid systemic side-effects. Lidocaine, an anaesthetic, and steroids may be injected into joints for longer-term pain relief. And also is used for painful mouth sores and to numb areas for dental work. However, there are certain disadvantages like there is risk for patients who use NSAIDs long term for chronic conditions. Opioid receptors are also highly

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dense within the GI tract and therefore carry side effects such as nausea, vomiting, gastro-oesophageal reflux, and constipation. They're also responsible for a variety of mental, emotional and psychological symptoms. In the short-term when using painkillers people can become angry, hostile, withdrawn or confused. Long-term use may also lead to heart risks, high blood pressure, and kidney damage. Acetaminophen taken in large doses can cause liver failure and possibly death. Use of NSAIDs increases the risk of stomach ulcers too. Constipation is the most common side effects from opioids. There could also be allergic reactions like rash itchininess, swelling, wheezing.

Hypothesis

The current study is aimed for comparing the effects of consumption of painkillers due to two important factors i.e., work pressure and physical dependence as a necessity or a habit. Since there is a considerable increase in consumption of painkillers nowadays there is a need to study the cause it.

METHODOLOGY

Sample

“This pilot research work is carried out using case studies and survey method. The survey method consists of a self-developed questionnaire test which is authored by Mrs. Bhagyashree Kulkarni and co-authored by Miss. Aloma Castelino, Miss. Sanchita Aher and Miss. Tripti Singh. It is a set of 30 incomplete sentences called ‘stems’ where the response can either be a single word or a group of words. All questions are mandatory. It was conducted to compare the effects of consumption of painkillers due to work pressure and physical independence as a necessity or a habit in men and women in Mumbai city and rural (Junnar town) place and to check whether the individuals from city perspective were more addicted or from the rural settlements and to understand the noticeable changes in their personalities due to the painkiller addiction. The stems were prepared by reviewing various situations observed in daily life, in literatures and survey, based on the guidelines of Sack’s Sentence Complete Test.”

Procedure & Scoring

To support the hypothesis, author and co-authors conducted a survey with the help of a questionnaire. This questionnaire was administered on 200 individuals belonging to the age group of 30-55 years, out of which 100 samples were of city place and 100 sample were of rural. 50 samples were figured out to be of females and 50 samples of males each in city and rural region. These stems are scored in such a way that a response with positive feedback indicating that an individual is not so prone to painkillers or is aware of its side effects and believes in other remedies is marked as score 1 whereas the response with negative feedback is marked as score 0. In this survey, if the subject score comes out to be high, it is regarded as less addiction of him/her towards the painkillers; whereas if the score is low, the addiction towards painkillers is more of the subject. The total score calculated for every survey is out of 30 in which the maximum score can turn out to be 30 and minimum score to be 0. From this survey, three such case studies were collected to note down the level of addiction of painkillers and to show that this addiction is more in City perspective than rural settlement and also a data was referred to study which painkiller is consumed in larger amount.

Data Collection & Analysis

The author and co-authors communicated with the people around Mumbai area and village place i.e., Junnar town for the data collection and analysis of it, through a survey method conducted with the help of a questionnaire. To collect a greater number of samples they

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travelled through various public transportations, used the proper code of conduct while filling the questionnaire. They first made the individuals understand what the study is about, why it is conducted, how it is going to be analyzed and what conclusions were going to be drawn through it. For the subjects who could fill the questionnaire on themselves were made to write their own possible answers; whereas for those who were unable to read and write properly, the author and co-authors explained them each stems from the questionnaire in their comfortable language and wrote answers which were told by them without any manipulation. While conducting this, all the subjects were told the beneficiary part of this research work and also answered all the questions put up to them by the individuals in the most satisfactory way. For more ease, to tackle with the village people, the prepared questionnaire was converted into a rough copy of the rural language. People from both the regions were given different examples referring to the data analysis from the data collected of previous questionnaire, like what kind of perspective or an attitude any individual holds towards the consumption of painkillers. For letting a greater number of people know about this work, the questionnaire was also shared with many people with the help of electronic media using google forms stating all the information about this research work in it. After achieving the target of 200 individuals all the forms were scored in the format of points 0 and 1. The stems which after completion held the meaning in regards to the less consumption of painkillers was considered to be positive and the once which showed more consumption of painkillers were marked to be negative. The statements indicated as a positive statement was marked as point 1 and the statement indicating negative was marked as 0. After every in-person survey conducted, the author and co-authors made the individuals aware of the advantages and disadvantages about painkillers and also suggested them with such home remedies which would cause less side-effects compared to that of painkillers. Then on calculating the final scores for all the questionnaires and finding the average score separately for the city and village individuals with respect to the level of addiction towards painkillers, the effects of their consumption and reasons behind this habit formation were studied and the main factor, that why city people are more addicted towards painkillers than village individuals was observed after analysis of the data collection.

Questionnaire

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INSTRUCTIONS: “This test consists of 35 incomplete sentences called “stems”. The responses can either be a single word or a group of words. All questions are mandatory. There is no time limit to complete the test, however complete the test as soon as possible. There are no right or wrong responses.”

AGE: _____ GENDER: _____ OCCUPATION: _____

1. I consume painkillers like _____.
2. I was introduced to painkillers by _____.
3. I was introduced to painkillers because of _____.
4. The time at which I usually take the painkiller is around _____.
5. The painkiller I consume the most is _____.
6. Frequency of my tablet consumption is usually _____.
7. I consume the tablet mostly for _____.
8. After taking the painkiller I feel _____.

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9. I consume painkillers because
of _____.
10. I consume a painkiller when the pain is _____.
11. During work stress, my consumption of
painkiller _____.
12. After having severe pain due to lot of work I _____.
13. When I feel slight pain in my body I _____.
14. I know the effects of painkillers are _____.
15. Painkillers make my mind and body feel _____.
16. I consume a painkiller even
when _____.
17. I think taking a painkiller during pain
increases/decreases _____.
18. My tolerance towards pain
is _____.
19. Without a painkiller, I _____.
20. For a particular painkiller my body has
become _____.
21. The side effects I notice on me after consuming painkillers
are _____.
22. If there is no pain I still _____.
23. Painkillers I consume at a time are _____.
24. Without consuming painkillers I feel _____.
25. I feel painkillers
are _____.
26. Before taking painkillers I,
_____.
27. For painkillers I feel Doctor's consultancy is _____.
28. If given a choice between painkillers and home remedies I would go with
_____.
29. In absence of painkiller a medication I prefer is _____.
30. My addiction towards painkillers is _____.

Case Studies

Case Study No.1: "Pain reliever lowered the confidence of working efficiency"

A government employee, a 50-year-old woman, is suffering from the problem of arthritis. At the age of 32 she noticed some inflammation in her knees & always had severe pain. Later the pain increased & then it was found that she had arthritis. With doctor's consultancy she started taking some painkillers. She was asked to take painkillers only in case of severe pain. In the initial days she used to consume one tablet at a time and would feel relieved, after taking those tablets. This pain created hindrance in her professional as well as personal life and as days passed these medications were not resistant enough in order to bear that pain and hence, consequently she started consuming more than the prescribed doze and this resulted into other medical complications (addiction, effects on kidney, liver, inability to sleep, etc.). In this condition even though the subject who showed some signs of improvement of arthritis but due to the persistent use of painkiller, it did not allow her brain or senses to feel that there was any kind of improvement and hence with every passing day she started consuming more and more painkiller in order to continue her daily routine.

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Case Study No.2: “Professional work pressure has led to addiction”

An advocate, a 52-year-old man, is a diabetic patient, who also has cholesterol issues since the age of 35. During his initial days of work, he had less work pressure and consumed only those medicines that were prescribed by the doctor. With the increasing work pressure, he always had headache which later detected as a problem of migraine. The medications for migraine had also started with consultancy of doctor. This pain often created trouble in his work and hence he would not be able to concentrate on his work. After the medicines he felt much relaxed and could work properly without any complications. In order to avoid such problems in his professional life, he started taking medicines without doctor’s prescription. Within few months he noticed that he was unable to sleep properly, if he wouldn’t take those painkillers for headache. His frequency was 4 tablets per month and also took those medicines in mild pain. The disturbed sleep pattern, the frequency of his tablets clearly indicates his addiction towards the painkillers due to work pressure.

Case Study No.3: “Painkiller addiction has no age barrier”

A 30-year-old woman is working in a bank for last 10 years. She is suffering from major back issues from the last 5 years. She is on medications from last 5 years as prescribed by the doctors. During her work time she has to sit daily for 8 hours on her desk due to which this back-pain issue was started. Initially, she ignored the pain but later it became more painful and so she started consuming some painkillers during her work hours. This pain usually affected her work. But as soon as she would take her medicines, she would feel better and was able to concentrate on her work. Sometimes she would also take 2 painkillers in a very small interval of time. Soon the frequency of her consuming these painkillers increased to not let her work get affected. This later made her believe that to concentrate on work, taking those painkillers would be the best solution and then even in her mild pain she started consuming those painkillers. This made an effect on her kidneys and was diagnosed with some problem related to kidney. The popping of those painkillers had now become a habit and in any kind of stress, she would take those painkillers and feel relieved. This clearly indicated that taking medicines for the back pain soon became an addiction due to the work pressure.

DISCUSSION

An **analgesic** or **painkiller** is any member of the group of drugs used to achieve analgesia, relief from pain. Analgesic drugs act in various ways on the peripheral and central nervous systems. They are distinct from anesthetics, which temporarily affect, and in some instances completely eliminate, sensation. “Current study was a pilot research work based on Case Study & Survey Method, used to compare the effects of the consumption of painkillers due to work pressure and physical dependence as a necessity or habit in the age group of 30-55 years in men and women in Mumbai city and village (Junnar town). This survey was a questionnaire comprising of 30 incomplete sentences called “stems”. The response could either be a single word or a group of words.”

The survey conducted, was used to note down the level of addiction towards painkiller. Painkillers are considered incredibly addictive, and the number of people who abuse and become addicted to the opioids is on the rise. There is also an increasingly apparent link between the abuse of prescription opioids and heroin in the U.S. Prescription opioids are one of the broad categories of drugs that present the possibility of abuse and addiction. The other two types are central nervous system depressants and stimulants. Some contributing factors to painkiller addiction epidemic include the increasing number of prescriptions being written and dispensed, as well as a growing sense of social acceptability to use these medications.

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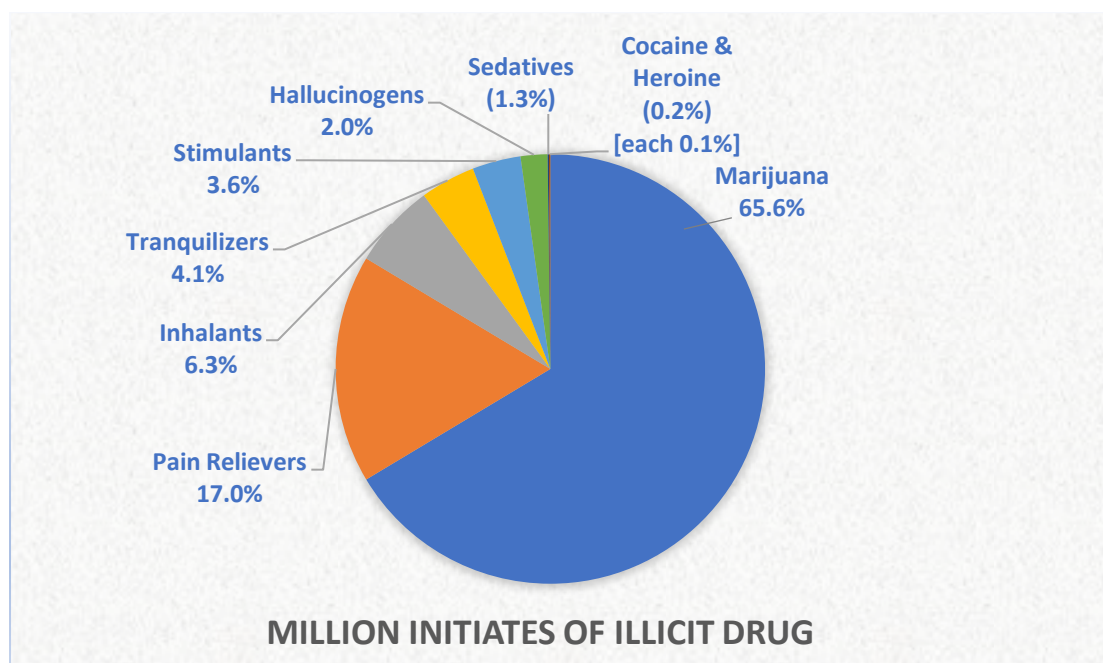
There has also been an intense marketing by pharmaceutical companies which is seen as a contributing factor for widespread abuse.

Many people question the painkillers addiction in addition to wondering what makes the painkiller so addictive. For e.g., Prescription opioids impact the brain systems same as heroin and morphine, and they are most addictive when they're taken in ways which increase the euphoric effect. This can include crushing and snorting pills or combining pills with other drugs or alcohol. Another risk factor for addiction includes people who get prescription and still don't take them exactly as they're prescribed. For e.g. taking more pills in one dose than what's prescribed by a doctor. Estimates show that more than 100 million people in the U.S. suffer from some sort of chronic pain, which is another reason the use of opioids is so prevalent, so even if a small fraction of this number of people develops a dependency on prescription painkillers, it represents a significant problem. The potency of addiction is incredibly high with prescription opioids. Some of the risk factors that contribute to the addiction potential include a history of dependency, including addiction to tobacco or alcohol, a family history of addiction, or a history of mood, or personality disorders such as depression, anxiety or borderline personality disorder. Whether you suffer from physical or mental pain, at the end of the day it still takes its toll. Fortunately, there are other ways to deal with pain than continuing down the opioid trail of tears. Addiction will make things worse while we convince ourselves everything will get better. Recovery is the only power that can make it all better.

Some reasons for painkillers being addictive are mentioned as follows: Opioid painkillers create a euphoric high when they're injected, taken in ways other than what's directed, or taken in high doses. Opioids have the inherent ability to calm anxiety as well, and that is the reason painkillers can be so addictive. There is no definite answer as to how long does it take to get addicted as it varies from person to person, and some people may take painkillers without ever becoming addicted, while others may become addicted very quickly. Specific factors that play a role in, whether or not someone becomes addicted to painkillers, as well as how long it would take to develop that addiction include your biological makeup, how sensitive you are to a particular drug, and also the chemical composition of the drug itself.

There are some signs related to the abuse of painkillers: Taking drugs not as per the prescription (for example, taking larger doses). Consumption of drugs by ignoring the reason it was initially prescribed for. Missing work, social or family obligations because of the use of the drug.

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Data by The National Institute on Drug Abuse

With reference to the data provided by The National Institute on Drug Abuse (NIDA) regarding the number of painkillers consumed in the form of percentage; it is studied that; Marijuana is majorly abused drug which constitutes of 65.6%. As most people consume drugs in the form of painkillers as pain relievers in the amount of 17.0%. The remaining portion of the data is consisted about different drugs consumed in the lesser percentage. This includes Inhalants (6.3%), Tranquilizers (4.1%), Stimulants (3.6%), Hallucinogens (2.0%), Sedatives (1.3%), Cocaine & Heroin each (0.1%). This notifies that there is a great need of reducing these drug abuse and to figure out some other remedies in its place.

The above data is supported with the research findings from the current evaluation of the data collected through survey method with the help of a questionnaire mentioned above in the methodology section. All the male subjects were found out to be workers except one or two who are retired; whereas in female subjects half count was of working ones and other half of housewives. In this survey, if the subject score came out to be high, it is regarded as less addiction of him/her towards the painkillers; whereas if the score is low, the addiction towards painkillers is more of the subject.

From the **urban perspective**, majority of the subjects were found to be workers in different areas of profession like doctors, engineers, teachers, business person, service people, marketing & salesperson, working class (including servants, maids, employees, etc.) & also some housewives from female class. After the conduction of the survey it was found out that people from this place are more addicted towards the painkillers; as their scores ranged from **10 – 20**. The average score was calculated to be **18** which is very close to the half of the high score 30 that indicated more addiction towards the painkillers. The reason for this was, due to work pressure, as majority of the individuals, being the professionals were unable to figure out any other option to recline the strength of their body and due to the continuous work, some of them had been physically dependent on the painkillers so that they can effectively accomplish their tasks, which had also resulted into the painkillers habituation for seldom. It was observed that many of the subjects yet continue taking painkillers in the absence of the pain as their frequency of taking painkillers was very high i.e. 2 to 3 per day

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and on daily basis. Due to the working lifestyle that city place holds & the stress cause of several factors like competition, employment, maintenance of financial status, painkillers have become as a mechanism to pull on the day even just in case of normal body pain and because of these above reasons there are side effects noticed on the individuals like headache, feeling drowsy, tired, constipation, irritation, anxiety, mood swings, hostility, dizziness, etc.

Survey of the **rural setting** showed that majority of the subjects were found to be farmers with other skills like contractors, potters, house-hold stuff makers, hostelry, housewives, gardener, etc. While conducting this survey in this region, it was observed that in spite of low poverty line, illiteracy, unemployment, lack of basic infrastructure like hospitals, sanitation, place to live, lack of drainage facilities, lack of awareness about government policies, superstition, etc. even though pain is felt and in the absence of painkillers, people were yet well adapted to bear the pain and have been a great example of working effectively; as their scores ranged from **22 – 30**. The average score was calculated to be **26** which is close very close to the high score 30 that indicated less addiction towards painkillers. When tackled to find the reason behind this, it came to know that the type of land terrain, geographical conditions, seasonal variations, quality of unadulterated food, then the consumption of sedatives like *betel leaves, betel nut, cloves, other pepper, etc.*, and most important to meet up their daily targets, even if little pain is felt, people of this region instead of focusing on the pain for longer and consulting doctors again & again and getting prescript with painkillers which is even difficult for them to do so; they continue working to accomplish their tasks, because of which they are less habitual to the consumption of painkillers and that have built-up strong resistance towards pain for them. It was observed that even if they have any pain, they hold better hostility towards painkillers and due to this, their frequency rate of painkiller consumption is much less as compared to those living in the city region. Even in the case, after having any severe pain, the consumption rate was marked out to be less as they are more prone towards the usage of home remedies and giving natural relief to their physique.

From this survey test, three such individual's data were found to be relevant as the case study material mentioned above in the methodology. These case studies turned out to be from the city perspective only, in which it was clearly understood that effects of consumption of painkillers is due to work pressure and physical dependence both, as it has been regarded as the necessity and a formed habit due to dependency more in the city area and shows clear addiction toward its consumption than rural regions. **First case study**, is of a 55-year-old female who suffers from arthritis and was prescribed with a daily painkiller to which she increased her consumption, whenever she felt pain so that it wouldn't interfere with her work; due to this she lost her confidence of finishing work without a painkiller even in the absence of pain. **Second case study** refers to a 52-year-old male who suffers from diabetes and cholesterol issues. Due to increasing work pressure he would have headache which was later detected as migraine. This pain was a hindrance in his work and within few months he noticed that without painkiller for headache, he couldn't sleep well as he felt relaxed after consuming the same, which indicated his addiction due to his work pressure. **Third case study**, is of a 30-year-old female, who is a banker by profession and suffers from major back ache since the past 5 years. After noticing her work getting affected due to pain, the frequency of consumption of painkillers increased as it would make her feel better. It eventually resulted in kidney issues but she still continued consuming it under any kind of stress to feel relieved which proved that in spite of being young enough, painkillers can get anyone addicted to it.

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Therefore, after the complete administration of this test for the survey study between the effects of consumption of painkillers in men and women from the Mumbai city and village region (Junnar town), it resulted out with the findings that the subjects from the city have less physical and mental tolerance towards pain and the reason for this was due to high level of work pressure, daily lifestyle which has made them physically dependent and eventually habitual to it. Whereas, the subjects in rural area hold high tolerating power towards bearing the pain and in spite of having work pressure. They avoid consuming painkillers by knowing and noticing its side effects that painkillers have. It was observed that city people have lack of confidence to continue working without a painkiller even in case of not having any pain; while village people neglect the pain and continue with their work. This shows that, the use of home remedies needs to be inculcated in the lives of the people living in the city as painkillers are medically not good for health and can adversely affect other body organs if consumed again & again.

CONCLUSION

Irrespective of the expected scores to be obtained, there are individuals from both the places who marked the result as, the need of greater awareness regarding the refusal to the consumption of painkillers in the rural settings while at the same time showed the minimal usage of painkillers in the urban perspective i.e. some subjects from urban perspective have scored high which shows that they are making themselves built-up such as to reduce the use of painkillers and at the same time a subject from rural area has scored low which indicates there is a need of firm awareness campaign to be conducted amongst them to make them alert of these scenarios of the addiction of painkillers is not good for health. After analyzing the whole research work it was found that city people are more addicted towards the painkillers than the rural individuals and it was due to less versatile lifestyle and work pressure which has made them more addicted towards the painkillers.

The conclusion of this study is that people from the city are more dependent on painkillers as compared to those in the village hence, there is a great need of awareness amongst people from city places to avoid the use of painkillers on regular basis and to consume it only if the pain is unbearable.

REFERENCES

- Alcohol & Drug Rehab Programs | Nationwide Detox & Inpatient Centres. Retrieved from <https://www.therecoveryvillage.com/>
- Analgesic – Wikipedia. Retrieved from <https://en.wikipedia.org/wiki/Analgesic>
- Information About Illegal Drugs & Alcohol Abuse – Drug-Free World. Retrieved from <https://www.drugfreeworld.org/>
- Substance abuse – Wikipedia. Retrieved from https://en.wikipedia.org/wiki/Substance_abuse
- Painkiller – definition of painkiller by The Free Dictionary. Retrieved from <https://www.thefreedictionary.com/painkiller>
- National Institute on Drug Abuse (NIDA) | National Institutes of Health (NIH). Retrieved from <https://www.nih.gov/about-nih/what-we-do/nih-almanac/national-institute-drug-abuse-nida>
- Using medication: The safe use of over-the-counter painkillers – InformedHealth.org – NCBI Bookshelf. Retrieved from <https://www.ncbi.nlm.gov/books/NBK361006>
- U.S. Pharmacist Article. Retrieved from <https://www.uspharmacist.com/article/gastrointestinal-side-effects-of-opioid-analgesics>

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A case study on correlation between assertiveness and bystander effect

Mrs. Bhagyashree Kulkarni^{1*}, Miss. Mamta Kharde², Miss. Vaishnavee Kale³

ABSTRACT

Bystander effect is a phenomenon in which individuals are less likely to offer help to a victim when others are present. Although people may experience genuine concern in emergency situations, they might not always decide to help. This effect is often associated with the effect of groupthink or the herd mentality whereas assertiveness is associated with characteristics such as critical thinking, being self-assured and confident and taking initiative in social situations. The current study is the pilot research work based on case study and survey method. It studies the relationship between bystander effect and assertiveness in the age group of 18-25 years in Mumbai city. The survey was conducted with the help of tests and questionnaire. Out of 200 collected samples, 136 samples showed correlation between bystander effect and assertiveness. It was observed that individuals with high level of assertiveness showed less bystander effect. In several case studies, the relation between the bystander effect and assertiveness were observed. This survey was conducted to support these case studies and provide sufficient evidence to correlate the bystander effect and assertiveness of an individual.

Keywords: *Bystander; Bystander effect; Assertiveness*

Bystander effect is “the phenomenon in which the presence of people influences an individual’s likelihood of helping a person in an emergency situation” (John Darley and Bibb Latané, 1968). The greater the number of bystanders, the less likely it is for anyone of them to provide help to a person in distress. Basically, under this phenomenon, when there are fewer people in the scene or a person is alone, he/she is more likely to feel responsible to take some sort of action. On the other hand, if there are many people, there occurs a diffusion of responsibility and no single person is entirely responsible which then causes inaction. Bystanders often don’t try to help because they may be concerned for their own safety, don’t know what they should do to help or afraid that they may be picked on.

¹HOD and Assistant Professor- Department of Forensic Psychology, Institute of Forensic Science, Mumbai, Maharashtra, India.

²S.Y.BSc Student-Institute of Forensic Science, Mumbai, Maharashtra, India.

³ S.Y.BSc Student-Institute of Forensic Science, Mumbai, Maharashtra, India.

*Responding Author

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The concept of bystander effect was first demonstrated and popularized by social psychologists John M. Darley and Bibb Latané in 1968 after the murder case of Kitty Genovese in New York City (1964). The 28-year-old woman was brutally murdered outside her apartment. The attack lasted for around 30 minutes as she was stabbed 14 times, still not even a single person at the apartment came to assist her or call the police. This case was the major influence for Darley and Latané's research. In 1969, Bibb Latané and Judith Rodin conducted an experiment around a woman in distress, where subjects were either alone, with a friend, or with a stranger. 70% of the people alone called out or went to help the woman after they believed she had fallen and was hurt, but when paired with a stranger only 40% offered help. Additional research by Faul, Mark, using data collected by EMS officials when responding to an emergency, indicated that the health severity of the situation was correlated with the response of bystanders. Latané and Rodin (1969) suggested that in ambiguous situations, bystanders may look to one another for guidance, and misinterpret others' lack of initial response as a lack of concern. This causes each bystander to decide that the situation is not serious. A meta-analysis (2011) of the bystander effect reported that "The bystander effect was attenuated when situations were perceived as dangerous compared with non-dangerous, perpetrators present compared with not present and whether the costs of intervention were physical or non-physical. This pattern of findings is consistent with the arousal-cost-reward model, which proposes that dangerous emergencies are recognized faster and more clearly as real emergencies, thereby inducing higher levels of arousal and hence more helping." Timothy Hart and Ternace Miethe used data from the National Crime Victimization Survey (NCVS) and found that the bystander effect was present in 65% of the violent victimizations in the data. Half of the attacks in which bystander effect occurred were those where the victim and bystander were strangers.

As the study expanded beyond the initial concern with the number of bystanders, Latané and Darley (1970) proposed that the likelihood of a person engaging in prosocial actions is determined by a series of decisions that must be made quickly in the context of emergency situations. The decisions or steps involved in deciding whether to help or not are: noticing that something unusual is happening, correctly interpreting an event as an emergency, deciding that it is your responsibility to provide help, deciding that you have the knowledge and/or skills to act and making the final decision to provide help. If all of these decisions are positive then only actual helping occurs and the bystander effect is overcoming. Several factors contribute to the bystander effect, including ambiguity, group cohesiveness, and diffusion of responsibility that reinforces mutual denial of a situation's severity. There are several types of bystanders: Assistants (who help the bully and join in the bullying), Reinforcers (who provide support to the bully), Outsiders (stay away not taking sides, providing the bully with silent approval), Defenders (comfort the victim, try to actively stop the bullying), Passive defenders (not involved but dislike the bullying).

Darley and Latané (1968) conducted a research on diffusion of responsibility. The findings suggested that in case of an emergency, when people believe that there are other people around, they are less likely or slower to help a victim because they believe someone else will take responsibility. People may also fail to take responsibility for a situation depending on the context. They may assume that other bystanders are more qualified. They may also be afraid of being superseded by a superior helper for offering unwanted assistance.

The tendency to show bystander effect can be influenced by some situational or external factors. Hayden, Jackson, & Guydish (1984); Shaw, Borough & Pink (1994) states that we are more likely to help people who are similar to ourselves than people who are dissimilar.

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Further research by Hodges and colleagues (2010) suggests that similarity to others increases our empathic concern for them, and our understanding of what they are experiencing and thus we intend to help them more. Racial and ethnicity differences between victim and bystander also decrease the probability of helping (Richards & Lowe, 2003; Tukuitonga & Bindman, 2002). Higgins & Shaw (1999); Weiner (1980) found out that if we believe that the victim is to be blamed or believed to be responsible for their problem the tendency to show bystander effect is more. Although the presence of bystanders who fail to respond, inhibits helpfulness. It is equally true that the presence of a helpful bystander provides a strong social model, and the result is an increase in helping behavior among the remaining bystanders (Bryan & Test, 1967).

A literature review from researchers Ruud Hortensius and Beatrice de Gelder in “Current Directions in Psychological Science” (2017) outlines a new theoretical model of bystander effect that incorporates neural, motivational, and dispositional aspects. They suggest that personality plays a key role in a bystander’s reflexive or reflective reactions, and conclude that we don’t consciously choose apathy, but rather reflexively behave in that way. Various personality traits are suggested to be responsible for the behavior of bystanders.

Assertiveness is one of a personality trait which is found out to be related to the bystander effect. Oxford Dictionary defines assertiveness as “Forthright, positive, insistence on the recognition of one’s rights”. It is also defined as “the tendency to behave in assertive, forceful and self-assured ways” (Anderson & Kilduff, 2009). People who are assertive clearly and respectfully communicate their wants, needs, positions, and boundaries to others. The level of assertiveness demonstrated in any human community is a factor of social and cultural practices. During the second half of the 20th century, assertiveness was increasingly singled out as a behavioral skill taught by many personal development experts, behavior therapists, and cognitive behavioral therapists. Assertiveness is often linked to self-esteem. The term and concept was popularized to the general public by books such as “Your Perfect Right: A Guide to Assertive Behavior” (1970) by Robert E. Alberti and Michael L. Emmons and “When I Say No, I Feel Guilty: How To Cope Using the Skills of Systematic Assertiveness” Therapy(1975) by Manuel J. Smith.

From a behavioral standpoint, assertive people are firm and react to positive and negative emotions without becoming aggressive or resorting to passivity. Assertiveness is often associated with higher self-esteem, confidence and supports critical thinking and effective communication. It also includes accepting responsibilities and being able to delegate to others, being able to admit mistakes and apologize, maintaining self-control and having an equal behavior towards everyone.

Hypothesis:

The current study is aimed to find the correlation between the bystander effect and the level of assertiveness of an individual. Since there has been a decrease in the prosocial behavior of the general public nowadays, there is a need to study the cause of it.

METHODOLOGY

Sample

This experiment is carried out using case studies and survey methods. It consists of two questionnaires- Rathus Assertiveness Scale (RAS) and Bystander Effect Test (BET). BET is authored by Mrs. Bhagyashree Kulkarni and co-authored by Miss. Mamta Kharde and Miss. Vaishnavee Kale. It is a 30 item questionnaire that measures the extent of bystander effect of

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the individuals in Mumbai city, Maharashtra population. The statements of the questionnaire were collected by reviewing various situations observed in daily life, in literatures and surveys. Along with this, RAS (developed by Dr. Spencer A. Rathus, 1973) which consists of 30 items and measures the level of assertiveness of an individual was also used. These two questionnaires were administered on total of 200 individuals belonging to the age group of 18-25.

Questionnaire

Bystander Effect Test (BET)

Age:-_____ Gender:-_____

Instructions: - This test consists of 30 statements. Respond to each of the given statements by selecting one from the five options given viz. Always, Often, Sometimes, Rarely and Never. Make sure you answer all the questions. Even if a question does not seem entirely relevant, give the answer you consider will be most like you. There are no right or wrong answers and no time limit. In the statements given below, mark how often you would do something on a five-point scale of 0-4, where:

0-Always 1-Often 2-Sometimes 3-Rarely 4-Never

1. When there is an emergency which involves helping someone, I hesitate to help.
2. If I see a person dropping something, I would help him/her.
3. I would be the first person to help, if I see someone feeling dizzy in a train or bus.
4. I am most likely to help someone with a good appearance.
5. If I see some students tampering with the votes in college elections, I will report this to the college election committee.
6. If I see a lady have her purse taken by a thief, I would help her without hesitation.
7. I would offer my seat to an older person in a crowded public transport.
8. If I hear racist slurs directed towards the cashier in a store, I would hesitate to defend the cashier.
9. I believe that in an emergency situation, men are more likely to help than women.
10. I provide help to a beggar whenever I see any in a train or any public place.
11. I will probably assist someone in need only if given the chance to.
12. If I witness a road accident, I would hesitate to be the first person to help.
13. I am more likely to help someone if I am with my peers than alone.
14. I wouldn't hesitate to stand up against ragging and bullying in my hostel.
15. In my college, if I see a couple arguing loudly, I would try to diffuse the situation.
16. I would tell the teacher about a fellow student who's cheating in exams.
17. If I see a person harassing a girl in a public transport, I would speak up and help the girl even if other commuters are ignoring the situation.
18. I would hesitate to provide help to a disabled person to cross the road if I'm alone.
19. I am less likely to help a victim if I think he/she is to be blamed in that situation.
20. I believe that in emergency situations, elders should take the initiative to help.
21. If I see my classmates passing inappropriate comments to someone. I would ask them to stop.
22. I would hesitate to help if I don't know the course of action of helping in a situation.
23. I am less likely to help someone if I think that it will spoil my good mood.
24. At an election booth, if I see someone compelling other voters, I would report this to the concerned authorities.
25. I am less likely to help someone, when I'm in a hurry to reach somewhere.

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26. Most of the times, instead of helping because I'm genuinely concerned. I help to feel less guilty.
27. I would avoid to help an unknown person who requests for my mobile phone to make a call.
28. I can empathize but I hesitate to offer help to someone who needs it.
29. I am less likely to assist in emergency situations if among a group of strangers.
30. To some extent, I have experienced bystander effect in certain situations.

Case Studies

Death of Raymond Zach

Raymond Zach, a 53-year-old man living in California walked into the waters off Robert Crown Memorial Beach with an intention of committing suicide on the Memorial Day of the year 2011. He stood neck deep in water roughly 150 yards offshore for almost an hour. His foster mother called the emergency helpline for help and told them that he couldn't swim and was trying to drown himself. The police and the firefighters responded but did nothing to help Raymond. The firefighters asked the U.S coast guard boat to rescue him but no boat arrived at the scene. Firefighters later claimed that they did not have current training and certifications to perform land-based water rescue, and that funding for the program was cut. This claim was eventually found out to be false. Many civilians witnessed this incident on the beach as well as watched it from their homes across the beach but did nothing to help as they were expecting public safety officers to conduct the rescue. Some bystanders tried to help Raymond but were told not to intervene by the police present on the scene and let the public safety personnel handle the situation. A young woman finally entered the waters and pulled Raymond out to the shore. He later died at a local hospital of hypothermia.

Murder of Khaseen Morris

Khaseen Morris, a 16-year-old student, in September 2019 was killed in a violent brawl outside a strip mall Nassau County, New York. He later died the same night at the hospital, suffering from fatal injuries after being stabbed repeatedly in the chest. Morris was attacked by a group of teenagers as soon as he entered the area as he was seen walking with the ex-girlfriend of one of the attackers, Tyler Flach. Morris's close friend also got badly beaten by the group of boys when he tried to help. Around 50 to 70 people witnessed this brawl but no one came to Morris's rescue. Instead, many in the group continued take videos for social media and the video of Morris's murder went viral on the internet. No one intervened to assist the 16-year-old, even though he was outnumbered by a group of boys larger and older than him. The bystanders documented the whole incident rather than prevent it from happening.

2009 Richmond high school gang rape

A 15-year-old female student of Richmond High school in California was gang raped by group of young males in the school courtyard during the Homecoming dance on October 24, 2009. The victim was invited by a fellow classmate to join a group of males for drinking in a dark courtyard on campus. The victim, in her intoxicated state, was gang raped for almost two and a half hours, at times even with foreign objects. The victim was found unconscious under a picnic table and was shifted to the hospital in a critical condition. She was released from the hospital on Wednesday, October 28. Almost 20 people witnessed this heinous crime without calling 911 to report it. Many witnesses recorded the attack in their phones, cheered and made comments as the victim was being assaulted. Many witnesses didn't call the authorities as they feared retaliation from the perpetrators.

Murder of Amanda Froistad

Amanda Froistad, a five-year-old was murdered by her father Larry Froistad in the year 1995, in South Dakota. Larry Froistad, in a heavily inebriated state, set his house on fire, with Amanda trapped inside the house. Even though the death seemed unusual, the police did not prosecute Larry because the police personally knew Larry and could not believe he would murder someone. Amanda had also previously told her counsellor that she was being sexually abused but the case was not correctly followed up with the authorities, and Larry was not punished nor denied access to his daughter. In 1998, Froistad posted a confession of his murder on an online email list. He had also confessed to molesting his daughter to an online group of paedophiles. There were many different responses to his email but only 3 of 200 people reported the confession to concerned authorities.

DISCUSSION

Individuals who see or hear an emergency but are otherwise uninvolved are called bystanders. The bystander effect, or bystander apathy is a social psychological phenomenon that refers to the tendency of people to take no action in an emergency situation where others are present. The bystander effect was first demonstrated and popularized by social psychologists John M Darley and Bibb Latané in 1968 after they became interested in the topic following the murder of Kitty Genovese in 1964. Genovese was attacked and sexually assaulted by a man with a knife while walking home. Only a few bystanders had contacted the authorities as Genovese died. The story of Genovese's murder became a modern parable for the powerful psychological effects of the presence of others. It was an example of how people sometimes fail to react to the needs of others and more broadly how behavioral tendencies to act prosocially are greatly influenced by the situation.

The finding of Darley and Latané suggest that in the case of an emergency, bystanders do care about those in need of assistance but nevertheless often do not offer help. They also found that when people believe that there are other people around, they are less likely or slower to help a victim because they believe someone else will take responsibility. People may also fail to take responsibility for a situation depending on the context. They may assume that other bystanders are more qualified to help, such as doctors or police officers, and that their intervention would be unneeded. They may also be afraid of being facing the legal consequences of offering inferior and possibly dangerous assistance. Thus, intervention failure by bystanders is associated with failure to recognize the need for intervention (Oster-Aaland, 2009), failure to associate personal responsibility, and insufficient skills to intervene (Burn, 2009).

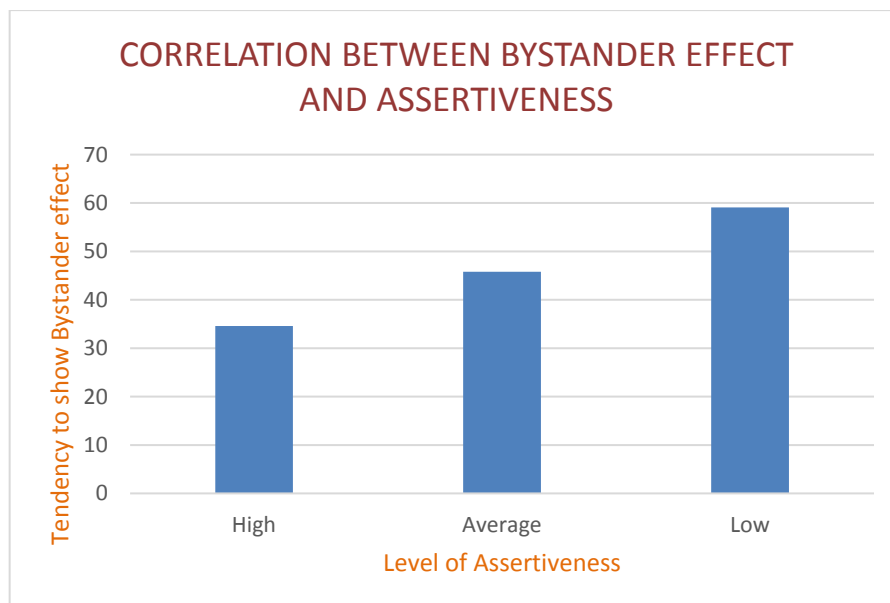
According to Latané and Darley's decision-making model, bystanders rationalize their decision on the basis of which choice (helping or not helping) will deliver the best possible outcome for themselves. The bystanders weigh the pros and cons of helping and are more likely to help when they view helping as a way to advance their personal growth, to feel good about themselves, or to avoid guilt that may result from not helping. Usually, the instantaneous response to an emergency is a feeling of distress and activation of the fight-freeze-flight system. Under these conditions, helping behavior does not occur, and the behavioral response is limited to avoidance and freeze responses.

Social influence also plays an important role in helping the bystander in the decision making process. The presence of others can influence the bystander's ability to realize that something is wrong and that assistance is required. However, in some cases, when other people act calmly in the presence of a potential emergency because they are unsure of what

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the event means, bystanders may not interpret the situation as an emergency and thus act as if nothing is wrong. Other social factors may also include having a close relationship with the victim or the individual in need of help (Levin, Prosser, Evans and Reicher, 2005), fear of negative evaluation or being judged by the peers (Berkowitz, 2009) and being of similar race or gender as the victim (Kunstman and Plant, 2008). The emotional state of the bystander also influences their decision-making process. Positive moods encourage bystanders to notice emergencies and provide assistance, whereas negative moods inhibit helping. However, emotions like guilt or sadness may also promote helping.

Significant correlation has been found between bystander effect and assertiveness in the age group of 18-25 years. Almost 80% individuals admitted to have experienced bystander effect in certain situations. 68% individuals possessing high level of assertiveness were found to show low bystander effect as their tendency to show bystander effect was just 34.6%. Whereas, individuals who were found to have average and low level of assertiveness were found to have 45.8% and 59.1% tendency to show bystander effect respectively. People with high assertiveness usually show high level of confidence, self esteem and stand up for their own as well as other people's rights in a positive and calm way. Therefore, as the results of the survey indicate, they tend to show less bystander effect. As they readily accept responsibilities and have an equal behavior towards everyone, they readily take the initiative in helping people irrespective of their physical appearance.



Correlation between bystander effect and assertiveness (based on the results of survey)

Also, according to the results of the survey, 54% individuals rarely considered someone's physical appearance as a factor in deciding to help them. This survey also infers that 76% individuals believed men are more likely to help than women in emergency situations. Many people also admitted that they would hesitate to help if they don't know the proper course of action of helping. As many as 64% people believe that in emergency situations, elders should take the initiative to help. The mentioned case studies also point to the fact that most of the people feel that it's not their responsibility to help and intervene in emergency situations. Thus, through this survey it has been observed that low assertiveness is one of the factors which contributes to the bystander effect in people.

CONCLUSION

Through this survey and case studies, it can be concluded that assertiveness and bystander effect are correlated. About 68% of individuals showed high level of assertiveness and less bystander effect. Hence, the outcome of this research indicates that the level of assertiveness is inversely proportional to the bystander effect.

REFERENCES

- 2009 Richmond High School gang rape. (2020, June 3). Retrieved from https://en.m.wikipedia.org/wiki/2009_Richmond_High_School_gang_rape
- Blagg, R. D. (2019, January 7). Bystander effect. Retrieved from <https://www.britannica.com/topic/bystander-effect>
- Bystander effect. (2020, June 5). Retrieved from https://en.m.wikipedia.org/wiki/Bystander_effect
- Cherry, K. (2020, May 10). Are You Guilty of Participating in the Bystander Effect? Retrieved from <https://www.verywellmind.com/how-to-overcome-the-bystander-effect-2795559>
- Darley, J. M. & Latané, B. (1968). "Bystander intervention in emergencies: Diffusion of responsibility". *Journal of Personality and Social Psychology*.
- Death of Raymond Zack. (2020, March 23). Retrieved from https://en.m.wikipedia.org/wiki/Death_of_Raymond_Zack
- Editors, B. D. (2019, October 4). Bystander Effect. Retrieved from <https://biologydictionary.net/bystander-effect/>
- Fuad, H. (2019, October 2). Hajira Fuad. Retrieved from <https://thewellesleynews.com/2019/10/02/an-avoidable-murder-of-a-student-caught-on-tape-the-sickening-power-of-the-bystander-effect>
- Murder of Amanda Froistad. (2020, May 30). Retrieved from https://en.m.wikipedia.org/wiki/Murder_of_Amanda_Froistad
- Robert A. Baron, Nyla R. Branscombe. *Social Psychology* (13th Edition).

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A Correlational Study Between Neuroticism Trait and Superstition

Mrs. Bhagyashree Kulkarni^{1*}, Miss. Aarathi Matcha², Miss. Aditi Patil³

ABSTRACT

This study investigated the relationship between superstitions and the personality traits of an individual in the city of Mumbai, Maharashtra population. 300 individuals completed two tests, one based on common superstitions found in the city and the other Big Five Personality Test. The samples were collected between the age group of 18-50 years. Out of 300 samples collected, 232 samples showed high correlation between neuroticism and the level of superstitions. This research was conducted in order to provide support to the case studies where the relation between superstitions and neuroticism was observed. It is observed that beliefs in superstitions is a byproduct of the over emotionality and irrationality inherent in neuroticism. Superstitions are also related with magic, black magic parapsychology, religious beliefs, and spirituality. In this sense the present study offers a bridge between neuroticism and the social marginality hypothesis of superstitious beliefs.

Keywords: *Superstitions, Neuroticism, Beliefs*

Superstition is a behaviour which does not have a transparent technical function within the execution of skill, yet it is believed to regulate luck and other external factors. Superstitions are not only inconsistent with the known laws of nature but they are also in opposition to the rational thoughts. There is a very fine line between superstitions and religious beliefs of the individuals. Superstitions are followed by individuals due to their internal fear whereas religion is believed by individuals because of their faith in God. Superstitious individuals have faith in luck, ghosts, evil spirits, omens, supernatural powers etc. and they have a perception that these powers govern their success and failures. Most of the ancient beliefs are argued nowadays as being superstitious which individuals follow blindly for the fear of being cursed or harmed by powers or God. Therefore, it's hard to form out the boundaries of superstition and it's a belief which is irrational and mysterious or a bent to realize privilege from the supernatural powers. Various researchers have put forth their theories about the development of superstitious behaviour. Skinner in 1953 suggested that a causal relationship between behaviour and the "consequences" is a possible

¹HOD and Assistant Professor - Department of Forensic Psychology, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

²S.Y.BSc Student, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

³S.Y.BSc Student, Institute of Forensic Science, Mumbai University, Mumbai, Maharashtra, India.

*Corresponding Author

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explanation for the occurrence and superstition in humans. Another explanation could also be derived from Langer's work on illusion of control. Langer stated that, people are inclined to see themselves as a cause, even in situations in which they are not influencing the situation. This explanation holds that people carry out superstitious behaviour in order to influence situations in which, in reality, they have no control.

Superstitions are also part of various cultures, such as in Chinese culture it is the number four that is considered to be unlucky. Whereas in Mexico and Latin America, it isn't Friday the 13th that's unlucky, but Tuesday the 13th. In Western cultures, three is the magic number — everything from the Holy Trinity to three little pigs, tends to be organized in threes. Even though global structures and motifs of superstitions can be very similar, cultural meanings and resonances can be very different. Sometimes superstitions are also related with the term magic. Magic is a concept that uses charms or spells to have supernatural control over natural forces. The definition of magic within the western tradition is distinct from religious or scientific modes; however, such distinctions of magic are subject to wide controversy. Magic includes Practices such as divination, astrology, incantations, alchemy, sorcery, spirit mediation, and necromancy. Magic helps to acquire knowledge, power, love, or wealth; to heal or ward off illness or danger; to guarantee productivity or success; to cause harm to an enemy; to reveal information; to induce spiritual transformation; or to entertain. A distinction is also made between "black" magic, used for wicked purposes, and "white" magic, used for beneficial purposes. People tend to relate superstitions with parapsychology. Parapsychology can be defined as the scientific and comprehensive study of out of the ordinary events linked with human experience that indicate the strict subjective/objective antagonism that may not be quite so clear as once thought. Phenomenon like astrology, alchemy, vampire, witchcraft, aliens, paganism, etc. are not encompassed in the field of parapsychology.

People with lowered capacity for critical thinking, less skilled logical reasoning and lower IQ's tend to believe in superstitions and irrational ideas. It is also seen that higher the level of superstition, higher the trait of conservatism and trait anxiety and lower the level of self-efficacy and external locus of control in the individual. In athletic population, superstitions proved to be fruitful as it is found to increase performance at both the physical as well as cognitive level of the sportsperson.

The big five personality traits are often abbreviated as OCEAN namely: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The broad domain of human behaviour is represented by these five traits which are responsible for differences that we see in humans in both decision making and personality. The statements in the test help to determine where the individual sits on a particular domain of the personality.

Openness to experience: People with this trait are known for their willingness to try out new things and always think out of the box. They are known for their wild imagination, insightfulness, curiosity and originality.

Conscientiousness: It is concerned with the aspiration to be careful, meticulous, and to regulate immediate gratification with self-discipline. Traits include commitment, determination, constancy and reliability.

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Extraversion: People with this trait have the capacity to initiate conversations with others and make social interactions easily and pleasantly. They prefer being with other individuals unlike the introverts. Traits include being approachable, lively, dynamic and confident.

Agreeableness: This trait measures the degree to which an individual interacts with others with compassion and cooperation. Traits include delicacy, tenderness, empathy and fidelity.

Neuroticism: Neuroticism, one of the traits of the Big Five Personality has been found to correlate with superstitions. Lower degree of neuroticism corresponds to emotional stability whereas higher degree of neuroticism is related to emotional instability. Disproportionate worrying and anxiety are exhibited by a neurotic personality. Neurotic people experience jealousy and become envious of other individuals when they feel that the other individual might exceed their level of excellence. Robert McCrae and Paul Costa described how individuals with high level of neuroticism subsist themselves during stressful situations: they tend to use inappropriate coping responses like hostile reactions because they are forced to deal more often with uncontrollable emotion. They may adopt irrational beliefs like self-blame because these beliefs are cognitively consistent with negative feelings they experience. Neuroticism appears to include not only negative affect, but also the disturbed thoughts and behaviour that accompany emotional distress.

METHODOLOGY

Aim: This is a pilot research which hypothesizes that individuals with high neuroticism personality trait are more superstitious. Since the prevalence of superstitions in India is increasing day by day there is a need to study the cause of it.

Methods: This pilot research consists of two tests namely The Big Five Personality Test and Beliefs in Extreme Superstitions Test (BEST). BEST is a 30-item questionnaire on superstitions that measures the extent and level of superstitions existent in the city of Mumbai, Maharashtra population. A total of 30 statements expressing various superstitions underlying in the common public, were collected through reviewing relevant literature/survey/ interview method. Along with this, The Big Five Personality Test which consists of 50 items that measure the five different personality traits of the individual was also administered. These two tests were administered on total 300 individuals belonging to the age group of 18-50 years.

Questionnaire: Beliefs in Extreme Superstitions Test (BEST) In the statements given below, for each statement, mark how much you agree on a scale of 0-3, where:

3=HIGH 2=MEDIUM 1=LOW 0=NOT AT ALL.

1. Teen tigada, kaam bigada.
2. The birth of a handicap child is a consequence of parent's sin.
3. For the father, daughter as his first child is considered good luck.
4. Stepping on lemon and chilies on road is considered bad luck.
5. Stop or turn back if a cat crosses your road.
6. When a crow shits on you, it's a sign of good luck.
7. Women on her periods must not enter the temple.
8. Hiccups symbolize that someone is remembering you.
9. One must not sweep the floor after sunset.
10. Friday the 13th brings bad luck.
11. Bathe when you come from funeral or hospital.
12. Knives under your bed drives away nightmares.
13. Spot of kohl on baby's forehead or in eyes, avoids evil eye.

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14. Don't leave slippers inverted.
15. Wishing on a falling star makes it true.
16. Never question a person where he is heading to.
17. It is a sin to eat meat on certain days.
18. Bathing in Ganges or holy water washes away your sins.
19. If Kumkum gets spilled, it will bring bad luck.
20. Plastering floor with cow dung is auspicious.
21. After a haircut, always have a bath.
22. Right palm itch will make you rich.
23. Owls are considered bad omen
24. One must throw coins in river to fulfil their wishes.
25. If an eyelash falls out, always make a wish.
26. Crows are referred to as our ancestors.
27. Entering new house with left leg first is inauspicious.
28. If a dog whines piteously at night, danger is ahead.
29. Frisking of left eye is a sign of getting sick soon.
30. Spilling of milk is considered as inauspicious.

RESULT

Significant correlation has been found between neuroticism and superstitions. As per Fig.no.1, Out of 300, 232 individuals were found to possess high score in neuroticism as well as in the superstitions, in which 67 individuals were males and 165 individuals were females. This indicates that individuals with neuroticism tend to have more depressed moods and suffer from feelings of guilt, envy, anger, and anxiety which gradually leads to their beliefs in superstitions. This instability in their minds makes them to believe blindly that certain events bring good luck or bad luck for them. It has been observed through this survey that beliefs in superstitions is a by- product of the over emotionality and irrationality inherent in neuroticism.

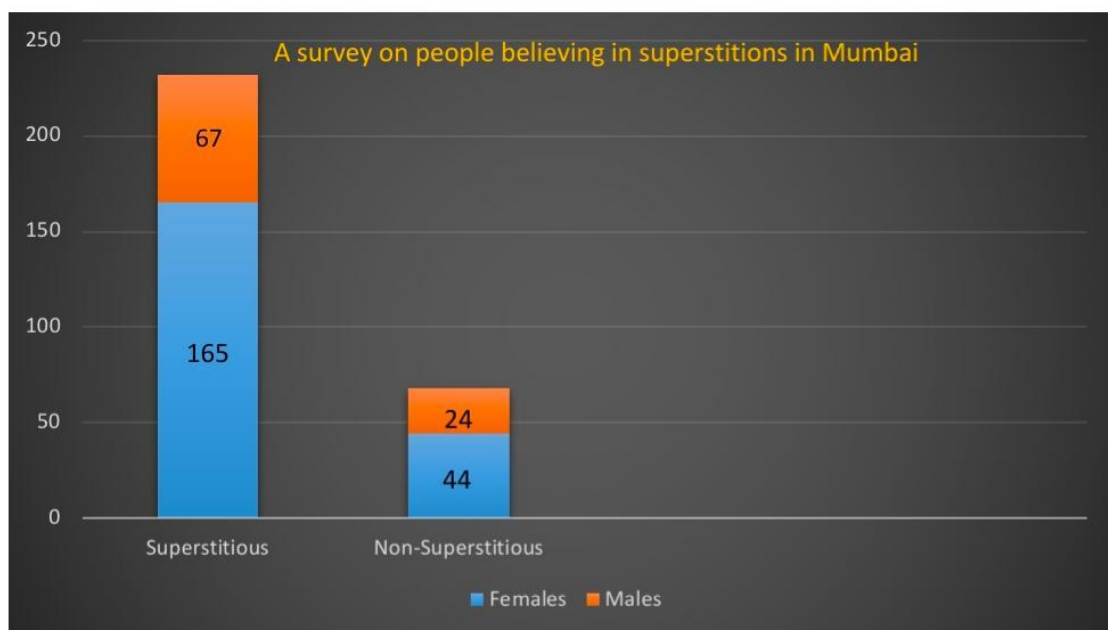


Fig.no.1: A Survey on people believing in Superstitions in Mumbai.

DISCUSSION

Superstition is a belief in the existence of forces or entities or practice resulting from ignorance, fear of the unknown, trust in magic or chance, or a false conception of causation that do not conform to the laws of nature or a scientific understanding of the universe. Many believe that the origin of superstitious beliefs was during the earliest days of humanity. Faced with natural occurrences like thunderstorms and earthquakes, also the unpredictability of illness and food supply, humans attempted to form an understandable world of powers that would be influenced by action. The earliest superstitions were created as a possible way to deal with the ignorance and fear of the unknown.

India – a realm under spiritual influence, where families consult astrologers before making big changes, and where the expression 'holy cow' takes on new meaning. We have seen instances of this 'spirituality' everywhere, including many occurrences where it may border on superstition. In front of many buildings and vehicles, cotton threads run through a small lemon and a handful of chilies before reaching up to hang from a doorway. Hindus believe this ornament repels the goddess of misfortune, Alakshmi, by stopping her from entering the household. This mythology is backed by science though, for the thread within the ornament diffuses an acidic scent that keeps away bugs and pests (which may bring misfortune). Indians (and many other cultural groups) believe in Drishti. It is caused when others think negatively or have envious thoughts about someone. This negative energy can supposedly bring physical or mental illness to whomever it is directed at. To protect themselves from this negative energy, people hang pictures of fierce and scary ogres in their homes or vehicles. Parents draw black “beauty marks” with kohl on their baby's forehead, or tie black thread around their hips because babies and children are seen as particularly at greater risk to attract jealousy and negative thoughts.

Spirituality is the process of searching the connection to divine mind within oneself. It has nothing to do with beliefs. Spirituality celebrates the innate self-authority we are each born with, to seek after one's own perception of divine truth and one's connection to it in a way that distinguishes our own timing and unique appearance as a soul. Superstition is an unverified belief handed down culturally that draws upon fear. It is born of unfounded 'what ifs' that play upon the power of human belief and the tendencies of unenlightened human beings to give up their own power of self-authority, and follow the herd.

The “deprivation theory” states that, in developing countries, people use superstitions to cope with the psychological and physical strain of their disadvantaged socioeconomic status. The “age theory” ventures that younger generations – being uncertain about their future, acquire superstitious thinking to form a means of stability in fast developing societies. Income is another factor in determining an individual's beliefs: lower socio-economic individuals visit fortune teller frequently and read horoscopes more often than higher socio-economic individuals. Widowed, divorced, and separated individuals also believe more in superstitions than their single counterparts.

Superstitious behaviour of an individual can be further explained with the help of motivation cycle. Motivation cycle is a transition of states within an individual that propels the individual towards a particular need, where motivation itself is considered hypothesized state. Superstitious beliefs are first initiated because of a particular need. This need drives the individual into taking actions. Positive results, caused due to the actions, further acts as an incentive motivating an individual towards believing in superstitions more. This phenomenon continues on and on as the individual can never stop believing in superstitions

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once he /she has started believing in superstitions. This phenomenon is termed as motivation cycle (Refer Fig.no.2).



Fig.no. 2: - Motivation Cycle.

CASE STUDY

Burari deaths not suicide but accident

New Delhi: On Sunday morning, Corpses of 11 members of the Bhatia family were found at a house in Delhi's Burari area. Ten bodies were found hanging and blindfolded, while the eldest family member Narayani Bhatia, 77, was found strangled in a separate room. The rest, including two 15-year-old boys, supposedly used chunnis (scarves) with religious designs on it and cables to hang themselves. They were gagged and blindfolded, with hands tied. The post mortem examination of six of the 11 dead revealed no signs of struggle. The Psychological autopsy study suggested that the members did not commit suicide, but it was an accident that occurred during the course of performing a ritual. The handwritten notes found on the spot indicated that none of the deceased had an intention to put an end to his/her life.

Disabled kids buried in garbage during solar eclipse in Karnataka

Bengaluru: In an incident of superstition which can be called an example of inhumanity, eight children were buried neck-deep in garbage and mud during the solar eclipse on 26th December, 2019. In some villages in Kalaburgi district of north Karnataka. These children were buried as the locals believed that such a ritual could cure their physical and skin ailments. The physically challenged kids and other kids with skin ailments belonging to the 4-11 age bracket were buried at 8 am, minutes before the eclipse started. Eventually, after an hour, unable to move and bear the heat and torture, the children began to cry. Showing some sympathy, two parents took their kids out of the muck. But others had to stay put till officials came to the spot and 'dug' them out.

CONCLUSION

The outcome of this research is, neuroticism is one of the reason responsible for superstitious behaviour of individuals. Concluded that individuals with high emotional instability believe more in superstitions. By this, it is found that superstitious individuals have faith in luck, ghosts 'evil spirits, omen, supernatural powers etc. They think that these powers govern their success and failure. Because individuals have strong need of control and are easily affected by even the smallest events and circumstances, they behave in unstable

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ways which eventually leads them to believe in superstitions since it provides them with a sense of control over these unpredictable events. This correlation between neuroticism and superstition has been confirmed.

REFERENCES

- Damisch L, Stoberock B, Mussweiler T. Keep your fingers crossed! how superstition improves performance. *Psychol Sci.* 2010;21(7):1014-1020.
- Dr. B. Tamilselvi, Sindhu B.(2016)A study of superstition among higher secondary school teachers in Kerala, *International Education and Research Journal* 2(11): 45-47
- Farley, Alexandra A., "A Qualitative Analysis of Superstitious Behaviour and Performance: How it Starts, Why it Works, and How it Works" (2015). WWU Graduate School Collection. 408.
- Justine James. (2013) *researchgate*. Posted January,2013.
- Lauren Block & Thomas Kramer.(2008)The effect of superstitious beliefs on performance expectations, *Journal of Academy of Marketing Science* 2008 37: 161-169.
- Manasvi Shrivastav, Dr. Anuradha Kotnala(2015)Psycho-social factors contributing to superstitious behaviour: literature review, *International Journal of Research - Granthalaayah* 3(5): 42-47.
- Praveen Shrestha. (2017) *psychestudy*. UpdatedNovember18,2017.
- Shalini Kannan. (2016) *milaap*. Posted April15,2016.
- Swechhachaari.(2017) *pragyata*. Retrieved March16,2017.

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Conflict of Interest

The author(s) declared no conflict of interest.

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