Quest Journals
Journal of Research in Humanities and Social Science
Volume 9 ~ Issue 3 (2021)pp: 54-60
ISSN(Online):2321-9467
www.questjournals.org

Research Paper

Occupational Health & Safety and Livelihood Implications of Tanneries

Dhinesh Raj K S[1]
School of Habitat Studies,
Tata Institute of Social Science, Mumbai. 400088.

ABSTRACT: *Current decade has seen tremendous development in industrialization in India. The quick industrialization in the nation is multi fold. One part of the nation is seeing driving modern development and has cleared approach to prospering exchange and great advancement of the country by yielding great income. Rest of the part is encountering danger to human wellbeing, security and respectability. Tanneries are one among the perilous area that causes a significant wellbeing sway for factory workers. The current paper endeavours to give a superior perspective on word related wellbeing and security in tanneries. Further, this aims to evaluate workers occupational health and safety among tanneries, livelihood implications of leather industries in the Vellore region of Tamil Nadu and how non-industry workers are associated to leather industries in Vellore region.*

KEY WORDS: *Occupational Health, Industrialization, Safety, Tannery, Leather industry*

Received 16 Feb, 2021; Revised: 28 Feb, 2021; Accepted 02 Mar, 2021 © The author(s) 2021. Published with open access at www.questjournals.org

I. INTRODUCTION

Occupational Health and Safety (OHS) management is vital and mandatory to maintain the compliance. Every year lives are compromised and many are under threat due to lack of ineffective OHS practices that causes death, injury or ill health (Saha, 2018). Production process in the Leather industry have different exposure level to certain carcinogens so it requires a standardization process (Liu et al., 2019). It is found that non-compliance working practice is found to be one of the leading causes of death among Indian population(Rasul &Sharma, 2014). These deaths are preventable with proper standardization of working conditions. These death and disability figures are never analysed or publicized. The International Labour Organisation (ILO) released a data which states that around 403,000 people in India die every year; that is more than 1,000/day and that is 46 every hour (Keane & te Velde, 2008). Various studies have been conducted in different parts of the world and in our country pertaining to occupational health and safety. Here attempts have been made to highlight the importance of few studies that enumerates the occupational health issues prevalent in tanneries.

Leather Industry holds key in Indian economy in view of its substantial overall output and county exports, since it is one of a largest amongst manufacturing sector generating significant export revenue for the country consistently with only few downfalls while the industry's employment strength increased to 2.5 million (I. Kumar, Zhalnin, Kim, & Beaulieu, 2017). However, the growth of the leather industry not only accounted to increase in employment also the occupational hazards to the workers. Studies have documented that leather industry is one of a most polluting[2] industry in the world due to its tanning process. The environmental impact, use of toxic chemical and its impact on workers' health were also documented by Human Rights and others. Less known are the impact on workers livelihoods, inadequacy of existing policy and legal framework implementations while assessing the occupational health and safety of workers in the tanneries. This research is a novel attempt to identifying the above mentioned.

Many researches have concluded that the sector not only lacks effective policy and framework to mitigate the occupational issues faced by workers and there were wide range of issues related to workers

[1]Research Scholar: School of Habitat Studies, Tata Institute of Social Science, Mumbai. 400088.
Email: dhineshrajks@gmail.com, Mobile: +91 - 9840371171
[2]https://www.worstpolluted.org/projects_reports/display/88

discrimination, quality of life, safety at work, health benefits etc. A standard policy framework regulating OHS in India is redundant due to its abundance and variability among different occupations. He contends that growing occupational research need in the areas of child labour, vast informal sector, industrial hygiene and OH surveillance which remains neglected in India. This is one such research why this study has been carried out focussing a section of informal sector (Meena, 2018).

Though India ratified many ILO conventions on Labor and Welfare, still reporting remains a concern as India have not reported on occupational, health and safety after 2007. Also many studies claim that fatal and non-fatal incidents reported by India is from 20%[3] of industries covered under the existing health and safety legal framework. the occupational accidents death numbers are alarming i.e., 48,000 workers in 2017 from the 20% industries covered under legal framework.

II. OHS IN TANNERIES AND WORKER'S HEALTH CONCERNS

Leather industry is one of the oldest industries in Indian economy and it has grown significantly from a raw material supplier to value added product exporter while being the second largest producer (Gupta, Gupta, & Dhamija, 2019), leather sector is considered as informal sector and the workers too. Compliance to the regulation has emerged as a huge task considering the sector's growth and complexities involved in the process with respect to environment, health and safety (Butler, 2011). Most of the requirements are interpreted in such a way in regulating the deregulation. A random sample of 197 male workers from 10 leather tanneries in Kanpur were selected for occupational health hazard/risk, also examined a control group involving 117 male subjects who were age and socio economically matched with no occupational exposure within leather units. The findings revealed a significantly higher prevalence of morbidity among the exposed workers in contrast thereto of the control group. The respiratory disorders were mainly liable for a better morbidity among the exposed workers whereas the alimentary canal problems were more prevalent within the control group. The urinary and blood samples collected from the exposed study subjects showed significantly higher levels of chromium, thereby reflecting the body burden of Cr in the exposed workers as a result of a high concentration of environmental Cr at the work place (Rastogi, Pandey, & Tripathi, 2008).

An estimated 2.78 million workers die per year as a result of occupational accidents or work-related diseases, this adds three trillion dollars of annual cost to the global economy (Boone & van Ours, 2006; Probst, Barbaranelli, & Petitta, 2013).Occupational deaths in India in the year 2011 was 387857 people (45/hour) (Yadav, 2019), and those mortality were due to Communicable diseases, Cancers, Respiratory Diseases, Circulatory diseases, Mental Disorders, Digestive systems diseases, Genitourinary system, Accidents and violence (Eijkemans & Takala, 2005). This is an indication on how vulnerable are the working groups to occupational health in India across sectors.

In a study conducted by GC Kashyap to assess the low back trouble among 284 male tannery workers at Kanpur. Workers above 35 years of age had high incidence of low back ache. A statistically significant association was found between long working hours (>11 hours) and prevalence of low back ache (Kashyap, Singh, & Chokhandre, 2016). Arjunan C conducted a study to assess environmental exposures due to tanneries on the general status of health in Erode district. It was found that dermatological disorders and gastrointestinal problem was prevalent in around 60% of the population studied. It was also concluded that the industrious hazardous waste may result in death and morbidity (Krishnamoorthi & Saravanan, 2011; J. V. Kumar, Rita, & Rajan, 2014).

Yogaraj GA conducted a cross sectional survey to find out the morbidity patterns among 230 workers in leather industry in Sripuram, Chennai. They were interviewed using pre-tested questionnaire. Socio-demographic profile, Health complaints, General and Physical examination for various health problems were assessed. Around 78% of workers were affected with health problems. Majority of the workers were affected with Musculo-skeletal disorder(31.7%) and others problems including Skin problem(15.7%), Respiratory problem(16.9%), Eye problem(6.5%), Ear problem(0.4%), Dental problem(2.6%), C.N.S problem(0.4%), C.V.S problem(0.9%), Abdomen problem(2.6%) and Uro-Genital problem(0.4%). There was an association between certain factors like Gender, Occupation, Nourishment, past history of illness with the morbidities among the leather workers (G., R., & J., 2014).

A cross sectional study was conducted on 316 general tannery workers by Islam R et al from 22 different tanneries in Hazaribagh, Dhaka, Bangladesh. Questionnaire was used for data collection and it was found that around 63.3% of workers were affected with health problems. Majority of the workers were suffering from dermatological problems (25.3%) followed by gastrointestinal problem (8.5%), chronic headache (8.2%), allergies (5.7%), respiratory system problem (6.3%), cardiovascular problem (6.3%) and eye problem (3.5%). personal protective equipment (PPE) were used only by 36.7% of individuals.. The tanneries did not have any

[3]https://timesofindia.indiatimes.com/business/india-business/48000-die-due-to-occupational-accidents-yearly-study/articleshow/61725283.cms

effluents or wastes treatment facilities. Smoking and low socioeconomic status were significantly associated with the morbidity of the tannery workers (Islam, Hossain, & Siddique, 2017).

A study was conducted by Atteq M et al in 332 tannery workers from Sheikhupura and Peshawar and compared with a control group of 112 individuals without chromium exposure. The sterility problem was found to statistically significant in males and in females in contrast to controls. The low survival rates in children and stillbirths were more pronounced in study group compared to the controls (Ateeq et al., 2016).

III. ISSUES, CONCERNS AND CHALLENGES – OHS AND LEATHER INDUSTRY

Workers health is always a serious concern in any industries, leather industries/tanneries are not an exception. Tanning process deals with hazardous chemicals, which involves use of chromium, a major threat to the workers employed, local inhabitants and regulatory bodies because of its poisoning effect that would affect ecology severely. It has been estimated that about 69,000 tons of chromium compounds was used in 1600 tanneries in chrome tanning process annually, with 25 to 39% has been spent in waste water and out of this 45% in the form of Cr+6 salts. Since chromium is highly carcinogenic in nature, it affects human through dermatitis, absorption, and inhalation (Iyer & Mastorakis, 2009). The usage of chromium is widely seen as environmental impact than an occupational health impact. Though there were references on the health impact, but no study has dealt this issue in detail. The use of hazardous chemicals is not only the reason for occupational health issues in tanneries, tanneries do pose numerous health hazards to the workers in the leather industries, improper safety precaution may even endanger their lives causing profound morbidity and sometimes mortality as well. Having mentioned these, there could be various other factors such as lack of implementation and monitoring of occupational health issues, lack of awareness on the policy and regulations related to hazardous industries, violating consent to operate norms and poor safety practices.

Most of the tanneries falls into the category of small and medium sale industries. The workers in this group constitute sizable portion of the total work force. Various definitions exist for small scale industries (for example employing up to 100 employees) and so are the limitations. Workers in industries like this are usually have several inherent disadvantages when compared with the larger counterparts because the employees do not form a critical mass large enough to justify the employment of full time safety and health personnel, hence Occupational health programmes often tend to reach those who need them least. National authorities find it much easier to inspect and obtain co-operation from larger management due to its public image. Priorities have become different for government agencies due to the spread of small scale units even though the stringent policy exists (Phoon & Parekh, 2007).

Two of the most critical challenges for the leather firms in the recent period are the growing emphasis on occupational health, safety and environmental and pollution control standards, and the greater scrutiny over labour practices. In a way, environmental non-compliance has direct impact on the occupational health of workers in any industry, but it depends on the process followed and the impact on the workers, society and environment. One such case occurred in Tamil Nadu where groundwater quality data collected by various government and private agencies indicate very high level of contamination, this has led to declined life expectancy of tannery workers while observing fear of impotency due to the consumption of contaminated water. As a result, forced migration of people from villages was taking place. Furthermore, the consumption of contaminated water led to common (reported) health problems such as skin allergies, asthma and gastritis (Divya & Vidya, 2016). Of the places in Tamil Nadu, Ranipet was identified as one of the World's Worst Polluted Places in the world by The Blacksmith Institute Report (2007). The potentially affected people have been estimated was up to 3,500,000. The source of pollution was found to be azodyes and Tanneries.

Referring to right to health, the United Nations General Assembly has acknowledged that this right embraces a wide range of socio-economic factors that promote conditions in which people can lead a healthy life. This extends to the underlying determinants of health, safety, healthy working conditions, and a healthy environment (Tshoose, 2014) Occupational Health and Safety is not a new concept; it dates back to 12th century where the "Jihlava Miners' Law" was introduced in Eastern Europe for safety regulations for miners. Among other things, it states that it is the employer's duty to ensure the help of a "wound healer" for injured miners (Malan, 1963). The concept later enhanced to have increased productivity, higher quality of work, increased workforce morale and reduced employee turnover, good work practices, reduce accidents and incidents etc. According to "Maslow's hierarchy of needs", human beings first look to satisfy their physiological and safety needs and next comes social, esteem and growth needs. With regard to the same, an individual at a workplace, looks for health and safety first and its absence can be a serious de-motivator (Meswani, 2008).

There are at least 18 ILO conventions that are targeted at addressing the issue of Occupational Safety and Health (OSH), India has ratified only three such conventions so far and important conventions on occupational safety and health and the working environment (convention 155), occupational health services (Convention 161), safety and health in construction (Convention 167), safety and health in mines (Convention 176), safety and health in agriculture (Convention 184), the promotional framework for occupational safety and

health (Convention 187) are yet to be ratified. Legal framework for the protection of workers in the formal units which employ only 10% of the workforce, has been in existence for long but the implementation has been lax. Also, availability of safety officers, factory inspectors and medical inspectors are less in numbers and has remained below optimal level. According to a recent assessment, there are twenty-one institutions across the country capable of training 460 specialists, which is considered as inadequate for the population of India's working class. It was reported that there are around 1,000 qualified occupational health professionals in India and while there are only 100 qualified hygienists. The current need for occupational health specialists in the country is much higher and there is a significant gap in the demand and supply of this specialist service (Ministry of Labor and Employment, 2012).

IV. UNSUITABILITY OF THE CENTRALLY DRAFTED REGULATIONS TO LOCAL SITUATIONS

India has number of labour legislations in place for the promotion and protection of workers' welfare. However, most of these labour laws look good only on paper, because neither workers nor their representative unions are completely aware about their ramifications nor do they take advantage of them. Regardless of complete enactment of comprehensive legislation, the number of occupational accidents in India is high. One of the reasons for this failure is the lack of enforcement; in such a case any law would be of no value. Inadequacy of health and factory inspectors in India make it tougher to conduct occupational health and safety audits/regular visits to organisations/companies. As a result, inspectors react only when complaints are lodged or when accidents are reported. Also, the inspectors have challenges (not adequately equipped) in responding to a complaint or an accident. One of other major reason for the inadequate levels of OHS in factories is the unsuitability of the centrally drafted regulations to local situations. Legislations are either not accounting distinctive work situations or unrelated to the hazard/risk. Obviously, workplaces differ from one another. Legislation, which ignores these differences, imposes very high costs on some workplaces, while others still remain unsafe, despite complying with the requirements. For example, the Factories Act requires minimum space for each worker to prevent overcrowding – 14.2 cubic meters for factories built after the commencement of this Act and 9.9 cubic metres for older ones, the validation is conducted by the health inspector basis building plan of the facility, hence, the total available space is divided by the number of workers, and thus unit wise (single work space) violations of work spaces cannot be discovered.

Furthermore, the levied penalties are insignificant. Health Inspectors are in conflict between being too simple on firms and bankrupting them. Particularly in poor areas, where unemployment plays an important role, the health inspector would not only consider the health of the employers, but also the security of their workplaces. The expected costs of noncompliance with legislation (the product of fine and probability of being convicted) therefore would be small compared to the expenses of improving the working conditions.

Lastly, constantly developing and changing technologies would be a challenge in formulating legislation and it would take time. Laws are only made when safety problems have already occurred, hence those are always some years behind the actual occurrence of hazards. Only a small section on the Indian labor force is employed in the organized sector; therefore, the law does not necessarily cover a larger part of the workforce. In the context of Indian situations, OHS hazards can be mitigated through economic incentives. Economic incentives in this realm have several advantages over regulations (PRIA, 2014).

V. CONSTITUTION OF INDIA, LEGISLATIONS AND PRACTICAL LOOPHOLES

The Constitution of India has framed a number of Legislations dealing with the safety, health and welfare of the workers employed in the organized sector. However, due importance has not yet been given to the workers in the unorganized sector. Planning commission attempted to fill up this gap by framing guidelines to draw up a coherent national policy on Occupational Safety and Health and to enact a general legislation on Occupational Safety and Health applicable to all workplaces including the unorganized sector in the country, even that proved to be a failure due to poor implementation and monitoring standards.

Supreme Court judgement pertaining to occupational health: The Petitioner from a non- profit occupational health and safety organization, registered under the Societies Registration Act, 1860, has invoked the extra-ordinary jurisdiction of this Court under Article 32 of the Constitution of India seeking for reliefs primarily to issue a writ of mandamus or any other appropriate writ, order, or direction directing the Respondents to frame guidelines with respect to occupational safety and health regulations to be maintained by various industries. The petitioner highlighted the serious diseases, the workers working in thermal plants are suffering from over a period of years, the report also indicated that half of the workers have lung function abnormalities, pulmonary function test abnormalities, senor neuro loss, skin diseases, asthama etc. Refering the same, the court passed an interim order on 30.1.2008, to reduce the occupational hazards of the employees working in various thermal power stations in the country after taking note of the various suggestions made (Supreme Court of India, 2008).

Despite all these statutes, the concept of occupational health and safety has not been accepted by the industrial workers and managements in India., the health and safety scenario in the Indian industry remains unsatisfactory. Workers in the unorganized sector are scarcely able to take advantage of the provisions under these acts (TIFAC, 2009).

VI. OHS COMPLIANCE – IMPACT ON ENVIRONMENT AND LIVELIHOOD

Govindarajulu and Priya (2011), in their study, "Leather Tanneries and Environment" made an attempt to environment and developments are like two sides of coin and both are inseparably linked to each other. Always there is some tradeoff between environment and economic development. Industrialization is one of the important means to usher economic and social transformation in the developing countries. Through the tanneries have substantial export and employment potentiality. They need to work hard to ensure environmental literacy and necessary knowledge about the state of environmental pollution. Governments and industrialists should use their conscience for welfare of mankind and work for the global of sustainable development. The tannery belt in Tamil Nadu, including the Vaniyambadi–Ambur cluster, has been experiencing extreme pollution from chromium and other chemicals coming from tanneries. Severe drinking water crisis for decades has been identified in villages around Ambur, caused by chrome pollution from waste water discharged by the tanneries.[4] The wastewater found its way into the agricultural fields, roadsides, open lands, and also into the river Palar, the main source of water for the residents of Tamil Nadu. The documentary 'En Peyar Palar'[5] (My Name is Palar) explains the severity of water pollution in the river Palar of Tamil Nadu that is murky and coated with a layer of slime and the river banks are littered with waste from unchecked discharges of effluents from the tanneries. Agricultural/farming activities have come to a standstill, as crops have disappeared due to the pollution.

VII. OHS POLICY AND LEGAL FRAMEWORK

The processes at leather factory are definitely not user friendly, it is very intensive and life threatening, if adequate protection measures are not involved. It is a well-known fact that the chemicals used in finishing and dyeing leather were extremely hazardous. Finishing and dyeing are banned in Europe and the USA, because it is hazardous and unviable.

The cost of finished leather turns out to be prohibitively high if effluent treatment was to follow reasonable standards of pollution control. As pollution control regulations in India are lax and the labour force is illiterate, it is a lucrative proposition for the exporters and a government hungry for foreign exchange. It may be derived from the results and facts, the industry's potential to generate revenue and the manpower involved lead to demand in more productivity, at the same time occupational health and safety is of paramount importance to keep workers away from risk.

Indian tanners including Tamil Nadu tanners may adopt techniques from foreign counter parts on strategy on effective implementation of OHS through capacity utilisation. Italy tanners are a great example of capacity utilization, the tanneries are focused on Batch Process through a co-operative mode with minimum limitations, hence Italy is very successful, and they are very good at OHS practices.

VIII. CONCLUSION

In the event of achieving productivity and effectiveness, emphasis on internal and external environment has been lost. The situation becoming grave day by day due to the impact on the environment, people and livelihood the industry created. Government and authorities should intervene and ensure regulation has not be deregulated considering the gaps and employer interpretation on the policies, procedure and framework. A simple clean up and monitoring on the medium and small-scale industries and proper utilisation of empowerment would flourish the industry further. Collaboration and co-operation are the hourly need to bring in the positive impact for a first step in abating the damage done.

The priorities for future developments aligned well with the identified needs like strengthening of prerequisites, infrastructures, capacities, and content of Occupational health and safety would aid for the implementation of the international standards, national policies, strategies, laws and programmes. This may reflect the identification of the existing gaps among the responding countries and pave way to reduce the occupational health issues related morbidity and mortality in the near future.

[4]Tougher than Leather: Working conditions in Indian Tanneries (P. Ray for Cividep–India and Framtiden i våre hender, 2015)
[5]En Peyar Palar part 1 (YouTube, Nov 2013: https://www.youtube.com/watch?v=ndhXM_gvc7U 33 A

REFERENCES:

[1]. Ateeq, M., Zareen, S., Rehman, H. U., Zaman, H., Ali, T., Rashid, L., … Jamal, F. (2016). Occupational allergic contact dermatitis in tannery workers of Peshawar KP Pakistan: An under estimated health issue. Journal of Entomology and Zoology Studies JEZS.

[2]. Boone, J., & van Ours, J. C. (2006). Are recessions good for workplace safety? Journal of Health Economics. https://doi.org/10.1016/j.jhealeco.2006.03.002

[3]. Butler, T. (2011). Compliance with institutional imperatives on environmental sustainability: Building theory on the role of Green IS. Journal of Strategic Information Systems. https://doi.org/10.1016/j.jsis.2010.09.006

[4]. Divya, K., & Vidya, R. (2016). A review on tannery pollution in Vellore District, Tamil Nadu, India. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 7(3), 1380–1384.

[5]. Eijkemans, G. J. M., & Takala, J. (2005). Moving knowledge of global burden into preventive action. American Journal of Industrial Medicine. https://doi.org/10.1002/ajim.20227

[6]. G., A. Y., R., U. D., & J., K. (2014). A cross-sectional study on morbidity pattern among leather factory workers at Sripuram, Chennai, Tamil Nadu, India. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 5(5), 1346–1352.

[7]. Gupta, S. K., Gupta, S., & Dhamija, P. (2019). An empirical study on productivity analysis of Indian leather industry. Benchmarking, 26(3), 815–835. https://doi.org/10.1108/BIJ-06-2018-0156

[8]. Islam, R., Hossain, M. S., & Siddique, M. A. B. (2017). Occupational health hazards and safety practices among the workers of tannery industry in Bangladesh. Jahangirnagar University Journal of Biological Sciences. https://doi.org/10.3329/jujbs.v6i1.33727

[9]. Iyer, V. G., & Mastorakis, N. E. (2009). Unsafe Chromium and Its Environmental Impact Assessment. Proceedings of the 2nd International Conference on Environmental and Geological Science and Engineering, EG '09, 50–56.

[10]. Kashyap, G. C., Singh, S. K., & Chokhandre, P. (2016). Risk Assessment of Low-back Trouble among Male Tannery Workers: A Study of Kanpur City, India. Occupational Medicine & Health Affairs. https://doi.org/10.4172/2329-6879.1000254

[11]. Keane, J., & te Velde, D. W. (2008). The role of textile and clothing industries in growth and development strategies. ODI Working Paper, (May), 1–71. Retrieved from http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3361.pdf

[12]. Krishnamoorthi, S., & Saravanan, K. (2011). Tannery Industry Effluent Treatment By Combinations of Activated Sludge Process and Combined Reverse Osmosis System. Journal of Environmental Research And Development.

[13]. Kumar, I., Zhalnin, A., Kim, A., & Beaulieu, L. J. (2017). Transportation and logistics cluster competitive advantages in the U.S. regions: A cross-sectional and spatio-temporal analysis. Research in Transportation Economics. https://doi.org/10.1016/j.retrec.2016.07.028

[14]. Kumar, J. V., Rita, S., & Rajan, D. (2014). Socio-economic condition of scheduled caste workers working in leather tanneries in Vellore District of Tamil Nadu. International Journal of Economic Research.

[15]. Liu, L., Chu, Y., Oza, S., Hogan, D., Perin, J., Bassani, D. G., … Cousens, S. (2019). National, regional, and state-level all-cause and cause-specific under-5 mortality in India in 2000–15: a systematic analysis with implications for the Sustainable Development Goals. The Lancet Global Health, 7(6), e721–e734. https://doi.org/10.1016/S2214-109X(19)30080-4

[16]. Meena, J. K. (2018). 203 Occupational health in india: present scenario, challenges and way forward. https://doi.org/10.1136/oemed-2018-icohabstracts.407

[17]. Phoon, W.-O., & Parekh, R. (2007). Occupational and Environmental Health: A Practical Manual. (G. K. Kulkarni, Ed.) (Vol. 11). Bhalani Publishing House, Mumbai, India.

[18]. Probst, T. M., Barbaranelli, C., & Petitta, L. (2013). The relationship between job insecurity and accident under-reporting: A test in two countries. Work and Stress. https://doi.org/10.1080/02678373.2013.850756

[19]. Rastogi, S., Pandey, A., & Tripathi, S. (2008). Occupational health risks among the workers employed in leather tanneries at Kanpur. Indian Journal of Occupational and Environmental Medicine, 12(3), 132–135. https://doi.org/10.4103/0019-5278.44695

[20]. Rasul, G., & Sharma, E. (2014). Understanding the poor economic performance of Bihar and Uttar Pradesh, India: A macro-perspective. Regional Studies, Regional Science. https://doi.org/10.1080/21681376.2014.943804

[21]. Saha, R. K. (2018). Occupational health in India. Annals of Global Health, 84(3), 330–333. https://doi.org/10.29024/aogh.2302

[22]. Yadav, S. (2019). How safe are industries in India? Ascertaining industrial injuries in Dadra and Nagar Haveli, India by capture-recapture method. Indian Journal of Occupational and Environmental Medicine. https://doi.org/10.4103/ijoem.IJOEM_190_18

[23]. Ateeq, M., Zareen, S., Rehman, H. U., Zaman, H., Ali, T., Rashid, L., … Jamal, F. (2016). Occupational allergic contact dermatitis in tannery workers of Peshawar KP Pakistan: An under estimated health issue. Journal of Entomology and Zoology Studies JEZS.

[24]. Boone, J., & van Ours, J. C. (2006). Are recessions good for workplace safety? Journal of Health Economics. https://doi.org/10.1016/j.jhealeco.2006.03.002

[25]. Butler, T. (2011). Compliance with institutional imperatives on environmental sustainability: Building theory on the role of Green IS. Journal of Strategic Information Systems. https://doi.org/10.1016/j.jsis.2010.09.006

[26]. Divya, K., & Vidya, R. (2016). A review on tannery pollution in Vellore District, Tamil Nadu, India. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 7(3), 1380–1384.

[27]. Eijkemans, G. J. M., & Takala, J. (2005). Moving knowledge of global burden into preventive action. American Journal of Industrial Medicine. https://doi.org/10.1002/ajim.20227

[28]. G., A. Y., R., U. D., & J., K. (2014). A cross-sectional study on morbidity pattern among leather factory workers at Sripuram, Chennai, Tamil Nadu, India. Research Journal of Pharmaceutical, Biological and Chemical Sciences, 5(5), 1346–1352.

[29]. Gupta, S. K., Gupta, S., & Dhamija, P. (2019). An empirical study on productivity analysis of Indian leather industry. Benchmarking, 26(3), 815–835. https://doi.org/10.1108/BIJ-06-2018-0156

[30]. Islam, R., Hossain, M. S., & Siddique, M. A. B. (2017). Occupational health hazards and safety practices among the workers of tannery industry in Bangladesh. Jahangirnagar University Journal of Biological Sciences. https://doi.org/10.3329/jujbs.v6i1.33727

[31]. Iyer, V. G., & Mastorakis, N. E. (2009). Unsafe Chromium and Its Environmental Impact Assessment. Proceedings of the 2nd International Conference on Environmental and Geological Science and Engineering, EG '09, 50–56.

[32]. Kashyap, G. C., Singh, S. K., & Chokhandre, P. (2016). Risk Assessment of Low-back Trouble among Male Tannery Workers: A Study of Kanpur City, India. Occupational Medicine & Health Affairs. https://doi.org/10.4172/2329-6879.1000254

[33]. Keane, J., & te Velde, D. W. (2008). The role of textile and clothing industries in growth and development strategies. ODI Working Paper, (May), 1–71. Retrieved from http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/3361.pdf

[34]. Krishnamoorthi, S., & Saravanan, K. (2011). Tannery Industry Effluent Treatment By Combinations of Activated Sludge Process and Combined Reverse Osmosis System. Journal of Environmental Research And Development.

[35]. Kumar, I., Zhalnin, A., Kim, A., & Beaulieu, L. J. (2017). Transportation and logistics cluster competitive advantages in the U.S. regions: A cross-sectional and spatio-temporal analysis. Research in Transportation Economics. https://doi.org/10.1016/j.retrec.2016.07.028

[36]. Kumar, J. V., Rita, S., & Rajan, D. (2014). Socio-economic condition of scheduled caste workers working in leather tanneries in

Vellore District of Tamil Nadu. International Journal of Economic Research.
[37]. Liu, L., Chu, Y., Oza, S., Hogan, D., Perin, J., Bassani, D. G., … Cousens, S. (2019). National, regional, and state-level all-cause and cause-specific under-5 mortality in India in 2000–15: a systematic analysis with implications for the Sustainable Development Goals. The Lancet Global Health, 7(6), e721–e734. https://doi.org/10.1016/S2214-109X(19)30080-4
[38]. Meena, J. K. (2018). 203 Occupational health in india: present scenario, challenges and way forward. https://doi.org/10.1136/oemed-2018-icohabstracts.407
[39]. Phoon, W.-O., & Parekh, R. (2007). Occupational and Environmental Health: A Practical Manual. (G. K. Kulkarni, Ed.) (Vol. 11). Bhalani Publishing House, Mumbai, India.
[40]. Probst, T. M., Barbaranelli, C., & Petitta, L. (2013). The relationship between job insecurity and accident under-reporting: A test in two countries. Work and Stress. https://doi.org/10.1080/02678373.2013.850756
[41]. Rastogi, S., Pandey, A., & Tripathi, S. (2008). Occupational health risks among the workers employed in leather tanneries at Kanpur. Indian Journal of Occupational and Environmental Medicine, 12(3), 132–135. https://doi.org/10.4103/0019-5278.44695
[42]. Rasul, G., & Sharma, E. (2014). Understanding the poor economic performance of Bihar and Uttar Pradesh, India: A macro-perspective. Regional Studies, Regional Science. https://doi.org/10.1080/21681376.2014.943804
[43]. Saha, R. K. (2018). Occupational health in India. Annals of Global Health, 84(3), 330–333. https://doi.org/10.29024/aogh.2302
[44]. Yadav, S. (2019). How safe are industries in India? Ascertaining industrial injuries in Dadra and Nagar Haveli, India by capture-recapture method. Indian Journal of Occupational and Environmental Medicine. https://doi.org/10.4103/ijoem.IJOEM_190_18