

# Safety Leadership and Injuries: A Study on the Manufacturing Sector of Pakistan, Using Safety Climate as a Mediator

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**Abstract.** Safety literature is in agreement regarding the effective role safety-specific leadership plays in occupational safety but most of these studies are limited to Western/American context. The current study looks to fill this void by testing safety-specific leadership effectiveness in Pakistani context. Data were collected from 163 workers of manufacturing industry. The results confirmed that safety-specific leadership strengthens followers safety climate perceptions and thereby negatively affects occupational injuries. Practical implications, future research directions and limitations of the study are also discussed.

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## 1 Introduction

Even though the quest for a safer workplace started way back, still ensuring occupational safety remains the biggest challenge for both theorists and practitioners (Barton and Sutcliffe, 2009; Clarke, 2013). The workers of most developed economy of the world, US still suffer millions of injuries every year (Boden et al., 2001). So the situation of occupational safety even in developed economies is less than ideal and a rigorous research is still going on to find out different ways in which the hazards at workplace can be reduced or removed completely. Therefore, it is not startling to see a plethora of research tackling the issue of workplace safety (Barling et al., 2003; Hofmann and Morgeson, 2004; Parboteeah and Kapp, 2008; Shannon et al., 1997).

Safety and health at work (International Labor Organization, n.d.) affirmed that over 317 million job related accidents happen annually and the economic encumber pose by them is estimated around 4% of global Gross Domestic Product every year. The figures are staggering and disturbing at the same time but whats more sad is that in a developing country like Pakistan, there is extinction of any reliable figures about the actual number of work related injuries/death which can explain the ground reality of working conditions. The last time any statistics about the number of occupational accidents in the country was provided way back in 2002-03, which reported 7400 fatal accidents in Pakistan for year 2002, whereas the number of serious and/or minor accidents is even greater (Pasha et al., 2003). The figures are of only those factories which are registered under the Factories Act of

1934, while a big chunk of factories in Pakistan are not registered under this act. Almost every day media breaks a story about a workplace accident and if work related injuries/deaths are calculated correctly the figures will be shocking. Due to extinction of any compensation/insurance schemes there is no recognized reporting system of industrial accidents (Pasha et al., 2003).

There are two reasons for the worse workplace safety conditions; one is that in developing countries occupational safety is not considered being a real problem, mostly because of inappropriate governance mechanism and labor laws, which can force the organizations to embrace workplace safety. Second, the researchers have also neglected this issue as not much research can be identified which have tackled this important issue or suggested some remedies for it. In a collectivist society like Pakistan, where a single person is usually the only financial supporter of his/her family, injury, disability or death of a worker means that the lives of several individuals will be badly affected, which makes the occupational safety an even more important issue for the workers of Pakistani organizations.

Ahmad (2013) stated that the chances of a Pakistani factory worker to get killed at work are eight times greater than a factory worker in France, which further explains the dismal condition regarding the situation of occupational safety in Pakistan. But even in developed countries, the work-related injuries are happening at a frequent rate (Zacharatos et al., 2005), which means that its not just about the cost issue (although its an important factor) but also about having a safety culture within an organization.

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The importance of leadership in achieving higher level of safety at workplace is evident in literature (Clarke, 2013; Cohen, 1977; Hofmann et al., 1995; Shannon et al., 1997). But there are limited studies outside Europe/America on the role of leadership in ensuring occupational safety (Pilbeam et al., 2016); especially with the emergence of concept such as safety specific transformational leadership (Barling et al., 2003). Few studies which have tested the relationship showed the positive role leadership plays in improving safety at workplace (Kelloway et al., 2006; Mullen et al., 2011; Mullen and Kelloway, 2009). Thus, this calls for more research on the topic, specifically in developing countries like Pakistan where workplace safety is a very serious issue.

The current study will examine the effect of safety specific transformational leadership on occupational injuries. Besides, the safety literature indicates the effect of leadership on safety outcomes is not direct rather indirect through safety climate (Barling et al., 2003; Kelloway et al., 2006; Smith et al., 2016; Zohar and Nemet, 2002; Zohar, 2000, 2010). Hence, the current study also uses safety climate as a mediator between safety-specific transformational leadership and occupational injuries. Finally, the study will add to the leadership-safety literature by presenting a research from a totally different cultural context like Pakistan, which will aid in theory development by explaining that whether the leadership-safety construct has any universal application in a culture which is alien from the one where the theoretical linkage was actually presented.

## 2 Literature Review

### 2.1 Safety-specific Transformational Leadership and Safety Climate

Safety climate perceptions are developed by employees on the basis of policies or actions implemented by organization to improve the safety situation (Cooper and Phillips, 2004). Neal and Griffin (2002) in the review of safety climate literature noted two important points; first that not much research has been conducted to identify various organizational factors that can build and retain safety climate; second, they identified leadership to be one of the most important factors in ensuring safety climate which has not been given due consideration. Few other studies have also agreed with their view about leadership being an important factor in creating and maintaining safety climate (Hofmann and Morgeson, 1999).

Clarke and Ward (2006) in a detailed study explained that when soft tactics (discussion and motivation) were used by the leaders to persuade employees towards safety, it yielded much better results. In addition to that safety climate strongly mediated

this relationship; moreover, they named this safety prone behavior as transformation of employees. A safety-specific leadership improves the safety climate of the organization to a far superior level (Wu et al., 2011). There is also considerable amount of empirical evidence supporting the association between safety-specific transformational leadership and safety climate (Barling et al., 2003; Clarke, 2013; Kelloway et al., 2006; Mullen and Kelloway, 2009).

*H1. Safety-specific transformational leadership is positively associated to safety climate.*

### 2.2 Safety climate and occupational injuries

Zohar (1980) put forward the concept of safety climate for the first time and defined it as the, summary of molar perceptions that employees share about safety (p.96). Safety climate perceptions are shaped on the basis of policies, procedures and practical actions taken by the organizations which shape up the positive or negative perceptions of employees about the safety climate. The more an organization is concerned about the safety situation and takes concrete actions to improve it, the more positive employees perception will be about the safety climate of the organization (Zohar and Luria, 2005). Strengthening positive safety climate perceptions indicates to employees that safety is not to be compromised for any competing demands like profit, production etc. (Zohar, 2010).

Employee perceptions of the safety climate are very important in the reduction of injuries at workplace. Pessimistic perceptions about safety climate can lead to higher number of injuries at workplace (Griffin and Neal, 2000; Zohar, 2000). A number of studies have tested the effect of safety climate on occupational injuries (Clarke and Ward, 2006; Liu et al., 2015; Nahrgang et al., 2011; Neal and Griffin, 2006) and reported that positive safety climate perceptions result in fewer number of injuries at workplace; thus, giving a strong empirical support to the safety climate and occupational injuries relationship.

*H2. Safety climate is negatively associated with occupational injuries.*

### 2.3 Safety climate as a mediator between safety-specific transformational leadership and occupational injuries

Transformational leadership has been considered as an important predictor of occupational safety (Zohar and Luria, 2004). Mullen and Kelloway (2009) argued that a general form of transformational leadership may be beneficial in some specific areas (e.g. organizational performance) but may not be as effective

in other areas (e.g. maintaining higher level of safety standards). Safety-specific transformational leadership which was designed to specifically intervene in the safety situation manages to ensure a much safer workplace (Clarke, 2013; Smith et al., 2016). Barling et al. (2002) noted that four Is of transformational leadership (inspirational motivation, intellectual stimulation, individualized consideration and idealized influence) when become safety-specific, they play an important role in articulating followers safety climate perceptions. Once followers safety climate perceptions are strengthened by the safety-specific leaders, it ultimately results in fewer number of injuries (Christian et al., 2009; Nahrgang et al., 2011).

Zohar (2010) stated that in organizational environment there are number of competing demands, such as profit, production, productivity and safety. The positive safety climate perception conveys to employees that safety is not to be compromised for the competing demands. And leaders play the central role in developing the perception that safety is not to be compromised for any competing demand (Zohar, 2010). A number of studies have clearly reported the mediating role of safety climate between safety-specific transformational leadership and occupational injuries (Barling et al., 2003; Clarke, 2013; Kelloway et al., 2006; Mullen and Kelloway, 2009). Thus, based on this empirical evidence, the current study also proposes safety climate to be a mediator between safety-specific transformational leadership and occupational injuries.

*H3. Safety climate mediates the relationship between safety-specific transformational leadership and occupational injuries.*

### 3 Theoretical framework



Figure 1: Conceptual Framework

## 4 Methodology

### 4.1 Sample & Procedure

Cross-sectional data were collected from 163 workers of manufacturing industries (garments, plastic and textile) from the Punjab province of Pakistan. The overall response rate was 57.7%. Most of the workers were male (88%), between 25-35 years old (44%), and having an organizational tenure of more than 5 years (58.5%).

Data were collected using survey method; while sample was drawn using convenient sampling technique.

### 4.2 Instruments

#### 4.2.1 Safety-Specific Transformational Leadership

Safety specific transformational leadership was measured using the scale developed by Barling et al. (2002). The sample items included my supervisor expresses satisfaction when I perform my job safely, and my supervisor shows determination to maintain a safe work environment. All items were assessed using 5-point Likert-type scale ranging from strongly disagree to strongly agree.

#### 4.2.2 Occupational Injuries

Data for occupational injuries were collected using the scale of Barling et al. (2002). A statement included in the scale which asked from the employees about the injuries they have experienced at workplace in last 6 months. The sample items are strains or pain, burns, fracture or bruises. All items were assessed using 5-point Likert-type scale ranging from strongly disagree to strongly agree.

#### 4.2.3 Safety Climate

Safety climate was measured using the scale of Zohar (2000). The sample items included my supervisor says a good word whenever he sees a job done according to the safety rules, and my supervisor approaches workers during work to discuss safety issues. All items were assessed using 5-point Likert-type scale ranging from strongly disagree to strongly agree.

## 5 Results

### 5.1 Correlation Analysis

Table 1 provides the result of mean, standard deviations, correlation and reliabilities. The result of correlation analysis provides initial support to the entire proposed hypotheses. To test our proposed hypotheses and the mediation analysis we used PROCESS macro developed by (Hayes, 2012). The PROCESS macro uses bootstrapping technique for testing of mediation and is considered to be the most efficient and reliable tool for conducting mediation analysis (Hayes and Preacher, 2014).

### 5.2 Regression Analysis

As proposed in hypotheses 1, safety-specific transformational leadership is positively associated with safety climate ( $\beta = 0.32$ ,  $p < 0.01$ ) providing support to

Table 1: Mean, Standard Deviations, Correlation and Reliabilities

Variable	Mean	S.D.	1	2	3
Safety-specific transformational leadership	3.28	0.68	(0.84)		
Occupational injuries	2.72	0.76	-0.56**	(0.87)	
Safety climate	3.3	0.63	0.72**	-0.52**	(0.88)

Note: Alpha values are on the diagonal

Table 2: Regression Analysis

Predictors	Outcomes					
	Safety climate			Occupational injuries		
Main effects:	$\beta$	$t$	$R^2$	$\beta$	$t$	$R^2$
Safety-specific transformational leadership	0.32	7.81**	0.42			
Safety climate				0.41	-9.40**	0.27
Mediator:						
Safety climate				0.23	4.84**	0.34

Note: \*\* $p < 0.01$

hypothesis one. Hypothesis two proposed that safety climate negatively relates to occupational injuries. The regression results also provided support for this hypotheses ( $\beta = 0.41$ ,  $p < 0.01$ ). To test our mediation hypotheses, we adopted bootstrapping technique using PROCESS macro on SPSS (Preacher and Hayes, 2008). The recommended 95% bias corrected confidence interval with 5000 re-samples was used to test the mediation effect. The results shows that safety climate fully mediates the relationship between safety-specific transformational leadership and occupational injuries ( $\beta = 0.23$ ,  $p < 0.01$ ). Thus, all the proposed hypotheses of the study have been accepted.

## 6 Discussion

The objectives of the study were to test the indirect effects of safety-specific transformational leadership on safety climate, and safety climate on occupational injuries. The results show that both hypotheses one and two have been accepted. The results confirm the findings of the previous studies on the proposed relationships (Barling et al., 2002; Kelloway et al., 2006; Liu et al., 2015; Nahrgang et al., 2011). Furthermore, the last hypothesis of our study confirms the mediating role of safety climate, which has been supported earlier in the literature (Clarke, 2013; Mullen and Kelloway, 2009). However, in a different cultural context like Pakistan, the safety-specific leadership develops workers perceptions of safety climate which ultimately results

in reduction of injuries at workplace.

Although, this study is a replication of the previous work, it still does make some important contributions to the safety literature. The role of safety-specific leadership in ensuring occupational safety has largely been carried out in the Western/American context (Pilbeam et al., 2016). The current study verifies those findings in a totally different culture like Pakistan. It provides universal support for the effectiveness of safety-specific transformational leadership in reducing injuries at workplace beyond Western/American cultures. Furthermore, the study provides support for having safety-specific leaders in Pakistani organizations, given the positive findings of the study. Lastly, as the safety literature reports that safety-leadership training is cost effective (Mullen and Kelloway, 2009), Pakistani organizations may be sensitive to cost which prevents them from investing in safety. The current study provides an alternative approach to investing in safety training for their leaders and achieve higher-level of safety at workplace.

### 6.1 Limitations and future research directions

The study adopted cross-sectional data collection technique, thus results must be viewed with caution and the future studies are advised to replicate our work in a longitudinal study design to verify the authenticity of our results. Also, the focus of our study was

on safety-specific transformational leadership because of its effectiveness over general transformational leadership (Mullen and Kelloway, 2009). However, given that our study provides support for its effectiveness the future studies may look to have comparative analysis between general and safety-specific transformational leadership. Moreover, because of high collectivism in Pakistani culture, it will be interesting to find out whether or not safety-specific trust has any moderating effect between leadership and workers safety climate perceptions.

## References

- Ahmad, S. (2013). Paradigms of quality of work life. *Journal of Human Values*, 19(1):73–82.
- Barling, J., Kelloway, E. K., and Iverson, R. D. (2003). High-quality work, job satisfaction, and occupational injuries. *Journal of applied psychology*, 88(2):276.
- Barling, J., Loughlin, C., and Kelloway, E. K. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. *Journal of applied psychology*, 87(3):488.
- Barton, M. A. and Sutcliffe, K. M. (2009). Overcoming dysfunctional momentum: Organizational safety as a social achievement. *Human Relations*, 62(9):1327–1356.
- Boden, L. I., Biddle, E. A., and Spieler, E. A. (2001). Social and economic impacts of workplace illness and injury: current and future directions for research. *American journal of industrial medicine*, 40(4):398–402.
- Christian, M. S., Bradley, J. C., Wallace, J. C., and Burke, M. J. (2009). Workplace safety: a meta-analysis of the roles of person and situation factors.
- Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. *Journal of Occupational and Organizational Psychology*, 86(1):22–49.
- Clarke, S. and Ward, K. (2006). The role of leader influence tactics and safety climate in engaging employees' safety participation. *Risk Analysis*, 26(5):1175–1185.
- Cohen, A. (1977). Factors in successful occupational safety programs. *Journal of safety research*, 9(4):168–178.
- Cooper, M. D. and Phillips, R. A. (2004). Exploratory analysis of the safety climate and safety behavior relationship. *Journal of safety research*, 35(5):497–512.
- Griffin, M. A. and Neal, A. (2000). Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of occupational health psychology*, 5(3):347.
- Hayes, A. F. (2012). Process: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling.
- Hayes, A. F. and Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology*, 67(3):451–470.
- Hofmann, D. A., Jacobs, R., and Landy, F. (1995). High reliability process industries: Individual, micro, and macro organizational influences on safety performance. *Journal of safety research*, 26(3):131–149.
- Hofmann, D. A. and Morgeson, F. P. (1999). Safety-related behavior as a social exchange: The role of perceived organizational support and leader-member exchange. *Journal of applied psychology*, 84(2):286.
- Hofmann, D. A. and Morgeson, F. P. (2004). The role of leadership in safety. *The psychology of workplace safety*, pages 159–180.
- Kelloway, E. K., Mullen, J., and Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. *Journal of occupational health psychology*, 11:76.
- Liu, J. C., Pereira, G., Uhl, S. A., Bravo, M. A., and Bell, M. L. (2015). A systematic review of the physical health impacts from non-occupational exposure to wildfire smoke. *Environmental research*, 136:120–132.
- Mullen, J., Kelloway, E. K., and Teed, M. (2011). Inconsistent style of leadership as a predictor of safety behaviour. *Work & Stress*, 25(1):41–54.
- Mullen, J. E. and Kelloway, E. K. (2009). Safety leadership: A longitudinal study of the effects of transformational leadership on safety outcomes. *Journal of Occupational and Organizational Psychology*, 82(2):253–272.
- Nahrgang, J. D., Morgeson, F. P., and Hofmann, D. A. (2011). Safety at work: a meta-analytic investigation of the link between job demands, job resources, burnout, engagement, and safety outcomes.
- Neal, A. and Griffin, M. A. (2002). Safety climate and safety behaviour. *Australian journal of management*, 27(1.suppl):67–75.
- Neal, A. and Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of applied psychology*, 91(4):946.
- Parboteeah, K. P. and Kapp, E. A. (2008). Ethical climates and workplace safety behaviors: An empirical investigation. *Journal of Business Ethics*, 80(3):515–529.
- Pasha, T. S., Liesivuori, J., and Finland, K. (2003). Country profile on occupational safety and health in pakistan. *Kuopio (Finland): Finnish Institute of Occupational Health*.
- Pilbeam, C., Doherty, N., Davidson, R., and Denyer, D. (2016). Safety leadership practices for organizational safety compliance: Developing a research agenda from a review of the literature. *Safety science*, 86:110–121.

- Preacher, K. J. and Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods*, 40(3):879–891.
- Shannon, H. S., Mayr, J., and Haines, T. (1997). Overview of the relationship between organizational and workplace factors and injury rates. *Safety Science*, 26(3):201–217.
- Smith, T. D., Eldridge, F., and DeJoy, D. M. (2016). Safety-specific transformational and passive leadership influences on firefighter safety climate perceptions and safety behavior outcomes. *Safety science*, 86:92–97.
- Wu, T.-C., Chang, S.-H., Shu, C.-M., Chen, C.-T., and Wang, C.-P. (2011). Safety leadership and safety performance in petrochemical industries: The mediating role of safety climate. *Journal of Loss Prevention in the Process Industries*, 24(6):716–721.
- Zacharatos, A., Barling, J., and Iverson, R. D. (2005). High-performance work systems and occupational safety. *Journal of applied psychology*, 90(1):77.
- Zohar, A. and Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of research in science teaching*, 39(1):35–62.
- Zohar, D. (1980). Safety climate in industrial organizations: theoretical and applied implications. *Journal of applied psychology*, 65(1):96.
- Zohar, D. (2000). A group-level model of safety climate: testing the effect of group climate on microaccidents in manufacturing jobs. *Journal of applied psychology*, 85(4):587.
- Zohar, D. (2010). Thirty years of safety climate research: Reflections and future directions. *Accident Analysis & Prevention*, 42(5):1517–1522.
- Zohar, D. and Luria, G. (2004). Climate as a social-cognitive construction of supervisory safety practices: scripts as proxy of behavior patterns. *Journal of applied psychology*, 89(2):322.
- Zohar, D. and Luria, G. (2005). A multilevel model of safety climate: cross-level relationships between organization and group-level climates. *Journal of applied psychology*, 90(4):616.