ORIGINAL ARTICLE

Relationship Between Safety Climate And Safety Performance Of Migrant Workers in Abu Dhabi's Construction Industry

Kamran Zafar[1], Shamsul Bahri MD Tamrin[1], Titi Rahmawati Hamedon[2], Muhammad Ahsan[1]

[1] Department of Environmental and Occupational Health, Faculty of Medicine and Health Science, University Putra Malaysia, 43400 Serdang, Selangor, Malaysia
[2] Department of Community Health, Faculty of Medicine and Health Sciences, University Putra Malaysia, 43400 Serdang, Selangor, Malaysia

ABSTRACT

Introduction: The safety of migrant construction workers is increasingly becoming a worldwide issue, and addressing this requires identifying the critical relationship between safety climate and safety performance. This research aimed to evaluate this relationship and to give proper attention to enhance the overall safety performance of construction workers. **Methods:** To assess the relationship between safety climate and safety performance of migrant construction workers, a cross-sectional study was conducted among 141 migrant construction workers, from the 2 industrial zones of Abu Dhabi. Sociodemographic characteristics, safety climate, and safety performance were assessed by using a specifically designed questionnaire for the construction industry. The collected data were analysed by SPSS 27.0 using descriptive statistics and χ^2 test. **Results:** The investigation's findings revealed a positive correlation between the safety climate and safety performance. However, the weakest correlation was found in the workers' comprehension of safety rules and procedures. **Conclusion:** Construction workers with less experience and lower education, aged 30 years or below, with no dependents to support, with smoking and drinking habits needs to be focused on the augmentation of their safety performance through safety awareness, relevant safety education, training and with the implementation of safety rules and procedures.
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Corresponding Author:
Kamran Zafar, BSc
Email: rajakamranz@yahoo.com
Tel: +971-547128788

INTRODUCTION

The economy of many developing countries heavily relies on their construction sector, which involves the development of crucial physical infrastructure like factories, airports, and tourist landmarks. In countries such as the United Arab Emirates (UAE), the construction industry plays a pivotal role in driving economic growth. However, this industry deals with significant safety and health challenges, particularly in Abu Dhabi, where it records some of the highest rates of fatalities and injuries. This is a matter of grave concern, especially for the majority of the workforce in this sector, who are migrant workers and are particularly vulnerable to workplace hazards. Extensive research in the past has shed light on the pressing issue of the health and well-being of these workers within the construction industry (1-5). As Abu Dhabi gears up for new projects like Saadiyat Reserve, Al Qana, Mina Zayed Redevelopment, and Jubail Marina, the influx of migrant workers into the construction sector is expected to surge. However, this growth also brings along an elevated risk of workplace accidents, potentially resulting in a higher number of fatalities among these workers.

Historical data in the construction sector reveals inadequate health and safety performance. While this issue is frequently attributed to the migrant workforce and their comparatively lower educational levels, it's essential to recognize that management also plays a significant role in preventing unwanted events, including accidents (6-9). Therefore, management shortcomings are often cited as the root cause of accidents, where management commitment is required by legal standards as well (10). Unsafe practices, hazardous conditions, and insufficient training have all been observed in various construction projects (11, 12). The construction industry operates within a dynamic work environment, which leads to a consistent increase in the occurrence of incidents. These incidents often involve accidents such as falls from elevated work platforms, being struck by objects, slips and trips, and the improper use of equipment (13).

Around 70% of construction firms in the UAE have

shown insufficient commitment to health and safety policies (14). A report from 2013 revealed that out of 130 construction organizations, a staggering 71% had no training programs in place for occupational safety and health (12). Previous research by Noura Al-Kaabi in 2002, titled "Construction safety performance in the United Arab Emirates" (7), and Shibani Abdussalam's study in 2013, titled "Health and safety influence on the construction project performance in the United Arab Emirates (UAE)" (8), have shed light on the safety concerns within the UAE's construction industry. According to Human Rights Watch, despite some improvements in working conditions, laborers in the UAE's construction sector continue to face harsh conditions. An investigation exposed that 88 migrant workers lost their lives in a construction site accident, yet only 34 of these fatalities were publicly reported (12). The primary objective of this study is to enhance health and safety conditions for the migrant workforce, individuals who have left their home countries to engage in 3D jobs (dirty, dangerous, difficult) and support their families back home financially (16). Furthermore, this research marks the first of its kind in the UAE, aiming to examine the relationship between the safety climate of construction companies and the safety performance of these migrant construction workers in the emirate of Abu Dhabi.

Zohar coined the term "Safety Climate" based on surveys in 20 Israeli manufacturing companies. It represents employees' collective perceptions of their work environment and guides their task-related behaviors (17). It refers to the psychological views of workers, about their beliefs, attitudes, opinions, and perceptions regarding safety within the organization at a specific moment. It is subject to variation over time due to changing circumstances (48). The Safety Climate concept enables the evaluation of organizational safety management practices and the identification of deficiencies that could contribute to injuries (18).

In the construction industry, researchers have employed diverse questionnaires to assess safety climate, aligning with its general definition (23). Surveys in the construction industry typically generate collective ratings that represent the workers' perception of safety. Zohar in 1980 created the first questionnaire with 40 items focused on several manufacturing industries, including the food, chemical, textile, and metal sectors (17). His model recognized eight factors influencing safety climate: "1. importance of safety training programs; 2. management attitudes toward safety; 3. effect of safety on promotion; 4. perceived levels of risk at the workplace; 5. perceived effects of the workplace on safety; 6. perceived status of safety officers; 7. perceived effects of safe conduct on social status; and 8. perceived status of the safety committee." Cooper and Phillips (2004) suggest that safety climate factors are specific to industries (38), and numerous studies have been conducted to identify the SCF in the construction industry (19-22). In this study, the researcher has adopted the Safety Climate Index Survey (SCI) developed by the Occupational Safety and Health Council (OSHC) Hong Kong with their permission. The SCI questionnaire was chosen for the study as it was developed from a 71-item questionnaire used in Australia, Hong Kong, and China, and its validity and reliability had been confirmed in the earlier studies carried out by the OSHC, which clustered it into seven factors (13, 20, 21, 23). These seven SCF are: "(SCF 01) Organizational and management safety commitment and concern for occupational health and safety, (SCF 02) Resources for safety and its effectiveness, (SCF 03) Risk-taking behavior and perception of work risk, (SCF 04) Perception of safety rules and procedure, (SCF 05) Personal involvement in safety and health, (SCF 06) Safe working attitude and workmates influence, (SCF 07) Safety promotion and communication". While many studies have explored the safety climate of construction workers using various questionnaires, this research uniquely determines the safety climate by employing a specifically designed questionnaire only for the construction industry.

"Safety Performance" refers to the level of safety within a company and is determined by the actions and behaviors of individuals in their efforts to enhance safety and health for workers, clients, the general public, and the environment, according to Burke et al. (24). Usually, safety performance in the construction industry has been assessed using reactive indicators which are after-the-loss types of measurements, such as recordable injury rates (RIR), loss time injury rates (LTI), days of absence, or any restricted work days (18). However, relying solely on lagging indicators might not adequately reflect the true safety conditions of the current working environment as it shows only the failure of the safety management in the past (50). Moreover, research has shown that companies often keep inaccurate records and tend to underreport incidents, making these indicators unreliable for a comprehensive safety assessment (25). Choudhry et al. (13) categorize measurement benchmarks for safety performance into four categories; i) data analysis related to incidents, injuries, near-misses, and the occurrence of safety-related incidents, ii) workers' adherence to safe work practices, iii) scheduled safety audits and iv) a balanced scorecard approach (13). However, safety researchers have refined the measurement of safety performance into "i) safety compliance, ii) safety participation, and iii) the number of accidents/injuries and near-misses". These are considered more effective leading indicators for proactively measuring safety performance (18, 26-31).

This relationship has been examined in different industry sectors by numerous researchers and may vary depending on specific working conditions (26). Several studies have identified a significant correlation between safety climate and safety performance (26, 27, 32-

34), with recent research indicating that safety climate can predict safety performance (35-37). However, it's important to note that not all investigations have recognized this relationship (25, 38). Given these varying findings in previous research, this study aims to determine whether safety climate among migrant construction workers in the emirate of Abu Dhabi influences their safety performance.

MATERIALS AND METHODS

Study settings

A cross-sectional study to evaluate the Safety climate of migrant construction workers and its relationship with their safety performance in Abu Dhabi's construction industry was conducted from May 2021 until October 2021 with the stratified purposive sampling method. Stratified purposive sampling is suitable when the main sample consists of multiple known-sized groups such as the known target population of construction workers in this study from three different countries, and the objective is to ensure fair representation of each subgroup in the final sample. In this study the sampled population was from Bangladesh, India and Pakistan working in the construction industry reflecting nationality as the main characteristic of strata. Each stratum has the similar experiences in construction industry to conduct research on the relationship between their safety performance and safety climate in the construction industry. At a 95% of confidence level and a standard error variance of P=0.5, a sample size of 100 participants was determined by using the equation "n = n'/(1+n'/N) " where n is the sample size from a finite population, n' is the sample size from an infinite population, N is the total population (1,513,376 in Abu Dhabi) and n' was calculated from the formula "$n' = S^2/V^2$ ", where S is the standard error variance of population and V is the standard error of sample population (49). For each stratum, stratified sample size was calculated from the targeted population of Indians, Pakistanis and Bangladeshis based on the population statistics of the Statistics Centre - Abu Dhabi (2020) (47) by using the equation " nh = (Nh / N) x n " (41). To account for potential dropouts, invalid responses, refusal to participate, or attrition, an additional 20% of respondents were included, resulting in a final sample size of 120 participants.

Ethical clearance

This study was conducted after receiving ethical clearance from The University Ethics Committee Connecting Human Subjects of Universiti Putra Malaysia, with Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM).

Selection criteria

Study locations were Al Ain and Musaffah industrial zones of the Emirate of Abu Dhabi where a higher number of migrant workers are working in construction projects. These construction companies were not only ranked as high-risk entities in the emirate of Abu Dhabi by the Abu Dhabi Public Health Centre (ADPHC) but also have the implemented OHSMS such as Abu Dhabi Occupational Safety and Health System Framework (OSHAD SF) and ISO 45001: 2018 Occupational Health and Safety (OHSMS). Area of each site was more than 550,000 m2 with more than 4000 mobilized manpower. Eligible construction workers for the study were those who met the following criteria: full-time workers in the emirate of Abu Dhabi, aged 18-60 years, and belonging to either India, Pakistan, or Bangladesh. However, part-time construction workers and individuals who refused to provide informed consent were excluded from the study.

Data Collection

Study data were collected by using a questionnaire that had been validated by various researchers, including Chan et al. (22), Hon et al. (26), Zahoor et al. (31), and Lyu et al. (39). By using a validated questionnaire, the researchers could have confidence in the quality of the data collected, enhancing the reliability and validity of their findings. It has been noted that the Safety Climate elements are thought to be industry-specific(38), and the adopted questionnaire from the OSHC of Hong Kong for this study fulfills the criteria to measure the safety climate perception. The questionnaire along with the consent was translated into Hindi, Urdu, and Bengali languages and validated by the experts for easy understanding and clarification to get reliable responses. The questionnaire comprised 3 parts totaling 60 questions; Part A: Personal Particulars comprising 12 queries, questioning the personal characteristics of the respondents. Part B: Measurement of Safety Climate comprising 38 statements. Respondents were requested to indicate their level of agreement on a five-point Likert scale, where a rating of 1 indicated strong disagreement and a rating of 5 indicated strong agreement. Part-C: Measures of Safety Performance comprising 10 statements (20, 26, 27). It consisted of three Safety performance indicators "i) The number of self-reported accidents/injuries and near-misses (4 statements), ii) Safety Compliance (3 statements), and iii) Safety participation (3 statements)". These three indicators are regarded as valid, authentic, and reliable indicators of safety performance (26, 27, 38, 39).

Self-reported accidents/injuries and near-misses indicator was measured by using four statements to calculate how many accidents, injuries, and near misses had been experienced by the respondent, during the last 12 months. There was a 5-point Likert scale (where 1 = never; 2 = 1 time; 3 = 2–3 times; 4 = 4–5 times; and 5 = over 5 times) for the respondents to answer these statements (26). Safety compliance was measured by using three statements as a percentage of the time (0-100%), the degree of safety compliance to all safety procedures by the worker, his coworkers on the same team, and every other employee in the organization adhered to the safety guidelines and procedures on

the construction site (20, 26, 40). Safety participation was measured by using three statements to determine whether there is any existence of a work atmosphere that fosters voluntary employee participation in actions that improve workplace safety, such as the respondent promoting safety and exerting additional effort at his workplace. Safety performance was evaluated using a 5-point Likert scale (where 1 = never; 2 = yearly; 3 = monthly; 4 = weekly; and 5 = daily) (27).

Data Analysis

The IBM SPSS software VERSION 27.0 was used to analyse the collected data. Before conducting the descriptive analysis, the data's normality was examined by using the Kolmogorov-Smirnov and Shapiro-Wilk normality tests. For small samples (less than 50 responses), Shapiro-Wilk test and for larger samples, the Kolmogorov-Smirnov test are usually used. However, according to Razali and Wah the Shapiro-Wilk test is considered the most powerful and suitable for all distribution types and sample sizes (15). A significant p-value of less than 0.05 signified that the study data was not normally distributed. Parametric tests like the Pearson correlation coefficients method, which is typically applied to evaluate the correlation between normally distributed variables, could not be used. Spearman's correlation coefficients test was applied to evaluate the strength of the relationship between both variables. Not normally distributed variables with more than three categories, such as country of origin were analysed by applying the Kruskal-Wallis test (42).

RESULTS

Socio-demographic and work information

Table I shows the overall information of the workers. Where 53.2% were Indians (N=75), 30.5% were Pakistanis (N=43) and 16.3% were Bangladeshi construction workers (N=23). All the respondents were male (N=141), mostly married (78%), and fit the age group of 31 to 40 years (56%). Among them, 33.3% and 32.6% of the workers were supporting 3-4 and 5-6 family members respectively. 65% of the respondents were those with secondary or diploma-level education. Most of the workers do not smoke (70.2%) and drink alcohol (82.3%).

Table II shows the overall work information of the migrant construction workers. Where laborers are 24.8% and skilled workers are 75.2% of the total respondents. Most of their employer were contractors (75.9%) and 66% are working with the current company for the last 5 years or less. The majority of respondents, accounting for 62.4% of the total, had work experience ranging from 6-15 years in the construction industry.

Relationship between safety climate and safety performance of the migrant construction workers

The study utilized Spearman correlation analysis to

Table I: Over all Socio-demographic information of the migrant construction workers

Characteristics	Frequency n	Percentage %
Country of Origin:		
Bangladesh	23	16.3
India	75	53.2
Pakistan	43	30.5
Age		
21 to 30	37	26.2
31 to 40	79	56
41 to 50	21	14.9
51 to 60	4	2.8
Gender:		
Male	141	100
Marital Status:		
Single	31	22
Married	110	78
Dependent family members:		
None	4	2.8
1-2	21	14.9
3-4	47	33.3
5-6	46	32.6
7 or more	23	16.3
Education Level:		
Primary & below (Grade 5 & below)	42	29.79
Secondary/Diploma (Grade 6 – 12)	91	64.54
Degree or higher	8	5.67
Smoking		
I don't smoke	99	70.2
I smoke, but not at work	22	15.6
I smoke even at work (including lunchtime & break)	20	14.2
Alcohol consumption		
I don't drink	116	82.3
I drink, but not at work	25	17.7

n = 141

Table II: Overall work information of group of people from three different countries

Characteristics	Frequency n	Percentage %
Work trade:		
Laborer	35	24.8
Skilled Worker *	106	75.2
Direct employer:		
Client	29	20.6
Contractor	107	75.9
Other **	5	3.5
Length of service with the current company:		
5 years or less	93	66.0
6-15 years	44	31.2
>15 years	4	2.8
Working experience in the construction industry:		
<5 years	39	27.7
6-15 years	88	62.4
16-20 years	9	6.4
>20 years	5	3.5

n = 141
* Skilled Workers: Such as; Scaffolder, Plasterer, Carpenter, Concreter, Metal worker, Jointer/ Welder, Bar bender & fixer, Plant & equipment operator, Building services/ E&M worker
** Other: Assistant Manager Quality, Auditor, QC Assurance Officer, Scaffolding inspector

assess the correlation between the safety climate and the safety performance of migrant workers. Table III provides a summary of the association among the safety climate and its factors with safety performance. As shown in Table III, a significant positive relationship (r = 0.272, p <0.05) has been found between the safety climate and safety performance of migrant construction workers from India, Bangladesh, and Pakistan. This study revealed that the SCF 03: Risk-taking performance and perception of work risk achieved the highest mean value (mean=3.61), where respondents reflected their understanding of the safety risks at their workplace and at the same time mentioned that they have to take risks at their jobs which do not get in the way of doing it. On the other hand, SCF 01: Organization and Management Commitment to Safety Climate showed the least mean value (mean=2.89) followed by SCF 07: Safety Promotion and Communication and SCF 05: Workers' personal involvement in safety and health (mean= 2.97 and 2.99 respectively). It identified the areas of improvement to recommend the measures to enhance the overall safety climate. Overall safety climate showed a satisfactory level with a mean value of 3.14 and the association between the seven factors of safety climate perception of the migrant construction workers with their safety performance revealed that all SCFs were significantly positively related to their safety performance except for SCF 03 i.e. "Risk-taking behavior and perception of work risk".

Table III: Correlation of safety climate and safety performance of migrant construction workers

Variable	Mean	± SD	r	P
Safety Climate	3.14	0.58	0.272	0.001***
SCF 01	2.89	0.66	0.339	0.001***
SCF 02	3.23	0.65	0.279	0.001***
SCF 03	3.61	0.67	0.013	0.875
SCF 04	3.29	0.66	0.203	0.016*
SCF 05	2.99	0.79	0.238	0.004**
SCF 06	3.03	0.69	0.245	0.003**
SCF 07	2.97	0.83	0.223	0.008**
Safety Performance	2.84	0.33	-	-

*p < 0.05
**p < 0.01
***p < 0.001

Comparison of the Safety performance among the migrant construction workers

To compare the safety performance among Indian, Bangladeshi, and Pakistani migrant construction workers, a chi-square test was conducted. Safety Performance in this study was calculated as occurrence of injury where occurrence of any injury to the respondent is Yes and absence of any injury is No (22). Table IV reveals that there is a significant association between the country of origin and safety performance ($p<0.05$, $\chi^2=6.828$). Moreover, the detailed difference in safety performance indicators, across the migrant construction workers from three different countries was carried out by the Kruskal Wallis test. Test results presented in Table V indicate that out of three, only one safety performance indicator about the number of self-reported accidents/injuries differs significantly among the migrant construction workers from India, Pakistan, and Bangladesh ($H2 =10.941$, $p = .004$).

Table IV: Safety performance comparison among Indian, Bangladeshi, and Pakistani migrant construction workers

Country of Origin	Safety Performance Injury Occurrence					
	No		Yes		χ^2	P
	n	%	n	%		
Bangladesh	1	3.7	22	19.3	6.826	0.033*
India	13	48.1	62	54.4	-	-
Pakistan	13	48.1	30	26.3	-	-
Total	27	100.0	114	100.0	-	-

* p < 0.05

Table V: Comparison of Safety Performance indicators among Indian, Bangladeshi, and Pakistani migrant construction workers

	Test Statistics [a, b]		
	Kruskal-Wallis H	df	Asymp. Sig.
Self-Rep Near Miss Injuries	10.941	2	0.004**
Safety Participation	1.240	2	0.538
Safety Compliance	3.107	2	0.212

** p<0.01
a. Kruskal Wallis Test
b. Grouping Variable: Country of Origin
Number of pairs: 3 (Bangladeshi, Indian and Pakistani)
New adjusted Sig Value: 0.017 (0.05 divided by 3)

Effects of demographic variables on the Safety performance of the migrant construction workers

The study conducted a chi-square test to analyse the effects of socio-demographic indicators on safety performance. As seen in Table VI only one variable namely country of origin showed a significant relationship with the safety performance of the migrant construction workers ($p<0.05$, $\chi^2= 6.826$). This means that the safety performance of workers may vary depending on their country of origin. It is important to note that other socio-demographic factors, such as age, gender, education level, and years of experience, did not show any significant relationship with safety performance in this study.

DISCUSSION

The study's primary objective was to determine the relationship of the safety climate with the safety performance of migrant construction workers in the Emirate of Abu Dhabi. To achieve this, a descriptive analysis was conducted to profile the socio-demographic and work information of these workers based on twelve variables, including country of origin, age groups,

Table VI: Effects of demographic variables on safety performance injury occurrence

		Safety Performance Injury Occurrence					
		No		Yes		χ^2	p
		n	%	n	%		
Country of Origin	Bangladesh	1	3.7	22	19.3	6.826	0.033*
	India	13	48.1	62	54.4	-	-
	Pakistan	13	48.1	30	26.3	-	-
Work trade:	Laborer	7	25.9	28	24.6	0.022	0.883
	Skilled Worker	20	74.1	86	75.4	-	-
Age	21 to 30	3	11.1	34	29.8	4.228	0.238
	31 to 40	19	70.4	60	52.6	-	-
	41 to 50	4	14.8	17	14.9	-	-
	51 to 60	1	3.7	3	2.6	-	-
Marital status	Single	3	11.1	28	24.6	2.302	0.129
	Married	24	88.9	86	75.4	-	-
Number of supported family members:	None	1	3.7	3	26	1.733	0.785
	1-2	3	11.1	18	15.8	-	-
	3-4	7	25.9	40	35.1	-	-
	5-6	11	40.7	35	30.7	-	-
	7 or more	5	18.5	18	15.8	-	-
Education level:	Primary & below	8	29.6	34	29.8	0.252	0.882
	Secondary/Diploma	18	66.7	73	64.0	-	-
	Degree or higher	1	3.7	7	3.1	-	-
Direct employer:	Client	7	25.9	22	19.3	0.602	0.740
	Contractor	19	70.4	88	77.2	-	-
	Other	1	3.7	4	3.5	-	-
Length of service with the current company:	5 years or less	16	59.3	77	67.5	0.680	0.712
	6-15 years	10	37.0	34	29.8	-	-
	>15 years	1	3.7	3	2.6	-	-
Working experience in the construction industry:	<5 years	6	22.2	33	28.9	2.808	0.422
	6-15 years	18	66.7	70	61.4	-	-
	16-20 years	3	11.1	6	5.3	-	-
	>20 years	0	0.0	5	4.4	-	-
Smoking Habit:	I don't smoke	18	66.7	81	71.1	2.013	0.366
	I smoke, but not at work	3	11.1	19	16.7	-	-
	I smoke even at work	6	22.2	14	12.3	-	-
Drinking Habit:	I don't drink	23	85.2	93	81.6		
	I drink, but not at work	4	14.8	21	18.4	-	-
Total		27	100	114	100		

* $p < 0.05$

marital status, dependents, literacy level, and habits of smoking or drinking. Additionally, the analysis encompassed aspects of their current work experience and their overall tenure within the construction sector. This comprehensive profiling of the workers is essential for gaining insights into their safety performance within the construction industry. Notably, gender was not a part of the analysis due to the exclusively male composition of the respondent group.

The study involved construction workers from India, Pakistan, and Bangladesh. Among these, Bangladeshi workers constituted 16.3% of the total respondents, exclusively male, and predominantly falling within the 31 to 40 age bracket. A significant portion of Bangladeshi workers were married and financially supporting 3 to 6 family members.

Indian workers represented the largest segment, comprising 53.2% of the respondents. They were also all male and predominantly clustered in the 31 to 40 age group. Indian workers generally exhibited higher levels of education compared to their Bangladeshi counterparts, with 62.7% having completed secondary or diploma-level education. Pakistani workers accounted for 30.5% of the total respondents, all male, and mostly within the 31 to 40 age range. Similar to Indian workers, Pakistani workers had a higher level of education compared to Bangladeshi workers, with 58.1% having completed secondary or diploma-level education. The majority of

workers from all three countries reported not smoking, although a small percentage acknowledged alcohol consumption outside of work.

Understanding the demographic characteristics of these workers holds great significance as it can inform the development of policies and interventions aimed at enhancing their health and safety in the workplace. The study also revealed that skilled workers were more prevalent than laborers, with many working under contractors. A significant portion of the respondents had less than 5 years of tenure with their employers, and most possessed extensive experience within the construction industry. Indian workers had the highest proportion of skilled workers, and many of them worked under contractors. Bangladeshi workers ranked second in this regard, with 6-15 years of contractor experience. Pakistani workers had the lowest proportion of skilled workers and the least industry experience, often engaging directly with clients. This data underscores the diversity of the workforce under consideration.

The current research has revealed a positive correlation between the safety climate and safety performance of migrant workers in the construction industry. These findings are consistent with earlier research conducted by Hon et al. (26), Zahoor et al. (31), Nadhim et al. (32), in construction industry and Borgheipour et al. (37) in cement sector, recognized that the enhancement of the safety climate can lead to the improvement of the safety performance of these workers.

The findings of this study shared commonalities with a similar research conducted in the Hong Kong construction industry by Chan et al. (22), where the study focused on migrant workers from Asian countries, much like the population sampled in this study. Both studies observed a positive relationship between safety climate and safety performance among migrant workers. Moreover, the effectiveness of SCF 01 "Organizational and Management Safety Commitment" and SCF 02 "Safety Resources and its effectiveness" are more significant in relation to the safety performance perception of migrant workers, while SCF 04 "Perception of safety rules and procedure" has the least significant impact. Similar findings were put forward by Lyu et al. (39), indicating that in the case of migrant construction workers, the commitment of management and worker participation have a significant influence on safety performance compared to inadequate safety procedures and work practices.

Construction companies traditionally maintain accident statistics; however, they are often reported or underreported to Government authorities and not readily shared with researchers. Al-Khaburi et al. (43) and Shibani et al. (8) have also pointed out this challenge in their respective studies. Safety Performance in this study was calculated as the occurrence of injury (44), where the occurrence of any injury to the respondent is Yes and the absence of any injury is NO. This study showed that Indians have the highest injury rates (54.4%) as compared to Pakistanis and Bangladeshi workers, who reflected 26.3% and 19.3% of injury occurrences respectively. A comparison of the safety performance among these three nationalities revealed that there is an association between the country of origin and safety performance, which echoes the findings of Mosly and Makki (45) in the construction industry of Saudi Arabia that the nationality affects the safety performance of the migrant workers, where the migrant workforce is similar to the construction industry of Abu Dhabi. These consistent findings support the outcomes of the study, which may be attributed to the homogeneity of the migrant workforce in the construction industry, as they share similar backgrounds and, consequently, similar perceptions. Moreover, the detailed comparison of the Safety Performance indicators "Safety compliance, safety participation, and number of self-reported accidents/injuries and near-misses", among Indian, Bangladeshi, and Pakistani migrant construction workers showed that out of three, only one safety performance indicator i.e. self-reported accidents/injuries and near-misses" is significant among the migrant construction workers.

Overall, the study encompassed a diverse range of participants, including various employee types, employers, age groups, working positions, and educational backgrounds. Notably, among the twelve demographic variables examined, only one variable, which is the participants' country of origin, exhibited a statistically significant effect on their safety performance. This aligns with Kim et al.'s research (46) on the safety management of foreign construction workers from Southwest Asia and China in the Korean construction industry. In contrast, a study by Han et al. (34) that focused on the construction industry in southeastern China with the local workforce, found that the age and experience of construction workers had a significant impact on their safety perceptions. However, in the current study where migrant workers were involved, these factors did not demonstrate a significant effect on safety performance.

CONCLUSION

This study revealed that the safety performance of the migrant construction workers and the safety climate were significantly positively correlated and interdependent. The workers' perception of safety climate is influenced by their country of origin, a significant association between the country of origin and their safety performance was found. Moreover, improving the safety commitment of management, ensuring the availability of effective safety resources, improving comprehension of safety rules and procedures, fostering worker participation in OHS, and promoting safety attitude and inspiration among coworkers will enhance safety performance and

contribute to the development of a safe work environment for migrant workers in the construction sector. Lastly, further research is needed in the construction industry of the UAE due to the limited studies conducted on this topic.

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