



PSYCHOLOGICAL IMPACT OF RIGHT HAND TRAUMA IN LABOR GROUP

Sindhu Khan¹✉, Unza Shaikh¹, Faisal Akhlaq Ali¹, Waqas Sami¹, Mehak Ali¹, Saira Bhutto¹

ABSTRACT

OBJECTIVE: To determine the correlation between the mean Disabilities of Arm, Shoulder, and Hand (DASH) scores and Impact of Event Scale-revised (IES-R) scores in laborer with right hand trauma.

METHODS: This correlational study was carried out at the Department of Plastic Surgery, Civil Hospital Karachi, Pakistan from January 2022 to June 2022. The inclusion criteria were laborers of any gender, age ≥ 18 years, presenting with right hand trauma having dominant hand infection and were medically fit and well and had no systemic illness. The severity of symptoms was assessed via DASH questionnaire. While psychological impact was assessed via IES-R.

RESULTS: Out of 60 patients, 56 (93.3%) were males and 4 (6.7%) were females. Mean age of the patients was 45.07 ± 14.96 years. Majority (n=50; 83.3%) of the patients were married. Overall, a moderate positive correlation was observed in between DASH score and IES score (r: 0.503, p: <0.001). Further stratification revealed moderate significant correlation of IES and DASH score for married workers (r: 0.578, p: <0.001), >5 years of experience (r: 0.663, p: <0.001); whereas strong positive correlation was observed for crush injury (r: 0.943, p: <0.001), puncture injury (r: 0.970, p: <0.001) and cut injuries (r: 0.754; p=0.012).

CONCLUSION: This study revealed a considerable relationship of DASH scale and psychological impairment in patients with right hand trauma. Worker who have gone through right hand trauma due to crush, puncture or cut injuries, married and those having more than 5 years of experience should be considered as high-risk population for psychological impairment.

KEYWORDS: Wounds and Injuries (MeSH); Hand trauma (Non-MeSH); Hand (MeSH); Hand Injuries (MeSH); Psychological impairment (Non-MeSH); Impact of Event Scale (Non-MeSH); Shoulder Injuries (MeSH); Arm Injuries (MeSH).

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INTRODUCTION

Hand trauma affects people in different ways, and the psychological impact of such trauma is often overlooked. In the labor group, the impact of right hand trauma can be severe, resulting in a loss of identity, purpose, and mental health issues.¹⁻³ For individuals in the labor group, their hands are their most valuable assets. They rely on their hands to perform their work, and in many cases, their work defines their identity. When a right-hand trauma occurs, the individual may experience a loss of identity, as their ability to work is compromised. This can result in feelings of worthlessness, hopelessness, and

depression.⁴

Like every other developing country, laborers are integral part of Pakistan's economy. The labour force in Pakistan, ranked as among the largest labour forces in the world, increased from 68.75 million in 2018-19 to 71.76 million in 2020-21 with an estimated increase of 1.51 million per year. Majority of labour force (37.4%) is working in agriculture sector, followed by industry, manufacturing and construction sectors.⁵

Pain, limited movement in function and constant pain for longer periods induces trauma related stress and has great psychological impact.⁶ Owing to increase number of depressive symptoms and

1. Department of Plastic Surgery, Dow University of Health Sciences, Civil Hospital Karachi, Pakistan.

Cell #: +92-345-2986695

Email✉: drsindhukhan@gmail.com

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severe anxiety due to hand trauma, it is highly crucial to provide psychological support post trauma. Majority of the population has right dominant hand. Hence, most of the works done by right hand. Therefore, the right-hand aids in earning for the laborers. Right hand trauma can result in anxiety and depression, which can be debilitating for individuals in the labor group. They may experience feelings of helplessness and hopelessness, as they struggle to perform basic tasks with their non-dominant hand. This can lead to social isolation, as individuals may feel embarrassed or ashamed of their injury.

The rationale of this study was that there is lack of data available on right hand trauma and its psychological consequences. The psychological impact might help in devising tailored management for the laborers. As the risk of hand trauma increases among laborers and these individuals are vital source and without them economy or any industry could crash, there is great need to devise psychological support for the victims. Hence, they could learn to cope with post traumatic symptoms and there could be less psychological impact over the laborers. This study was conducted with the hypothesis that there is a correlation between the mean Disabilities of Arm, Shoulder, and Hand (DASH) scores and Impact of Event Scale-revised (IES-R) scores. The findings of the study will be helpful in better understanding of the disease and ultimately management of the disease in future.

METHODS

This correlational study was conducted at the Department of Plastic Surgery, Civil Hospital Karachi, Pakistan from January

2022 to June 2022. The approval from the institutional ethical review board was obtained prior to the conduct of the study. Moreover, signed informed consent was obtained from the study participants prior to enrolment in the study.

The inclusion criteria were laborers age 18 years or above of any gender presenting with right hand trauma having dominant hand infection and had no systemic illness. Whereas physically handicapped individuals, hand trauma due to postoperative infection, and patients who sustained burn injuries were excluded.

Sample size was estimated using online sample size calculator for correlation taking statistics for correlation between DASH score and IES-R score as 0.356, power of test as 80% and 99% confidence level, the estimated sample size was 60.⁷ All patients were enrolled through non-probability consecutive sampling.

Hand infection was defined based on characteristics such as erythema, swelling, tenderness, and pus exudate. Laborers were defined as group of individuals involving in physical work such as industry workers, factory workers, construction site workers. Whereas trauma was defined as history of any injury such as hit, cut, and crush.

The severity of functional outcome was assessed via Disabilities of Arm, Shoulder, and Hand (DASH) questionnaire.⁸ Following an injury, function and impairment are evaluated using the DASH questionnaire. Thirty questions make up the questionnaire. Twenty-one questions assess the difficulty of performing particular tasks, five assess symptoms, and one each assess social function, work function, sleep function, and confidence function. On a five-point Likert scale, each question received one response. Higher ratings indicated more loss of upper-limb function, with total values ranging from 0 to 100.

Psychological impact was assessed via Impact of Event Scale (IES-R).⁹ The IES-R has three subscales, including hyperarousal, avoidance, and intrusion, and is best used for recent and specific traumatic events. The Avoidance Scale, Intrusion Scale, and Hyperarousal Scale are the three subscales that make up the results, which also provide a total raw score. Additionally, the average rating for the overall score and each subscale is provided, indicating the degree of post-traumatic stress disorder impairment, where 0 means no symptoms 1 means

limited symptoms, 2 means mild symptoms, 3 means very severe symptoms, and 4 means extremely high symptom levels. Participants received both the DASH and IES-R questionnaires in their native tongue.

SPSS version 24 was used to analyze the data. Mean and SD was calculated for quantitative variables whereas frequencies and percentages were calculated for qualitative variables. Spearman's correlation was applied to assess the strength of relationship between DASH score and IES-R scale. The stratification with respect to effect modifiers such as age, gender, employment and educational status was also being carried out. Post stratification Spearman's correlation was applied to assess the strength of relationship between DASH score and IES-R scale. $P \leq 0.05$ was taken as statistically significant.

RESULTS

Out of 60 patients, 56 (93.3%) were males and 4 (6.7%) were females. Age of patients ranged from 18 to 67 years and the mean age of patients was 45.07 ± 14.96 years. Majority ($n=50$; 83.3%) of the patients were married. Out of 50 married workers, 38 (76.6%) had children. Most ($n=46$; 76.7%) of the workers had more than five years of experience, 8 (13.3%) had less than two years whereas 6 (10%) had work experience of 2-5 years. Crush was the source of injury reported by 43 (71.7%) workers, puncture by 7 (11.7%), and cut by 10 (16.7%) workers. Most of the workers ($n=38$; 63.3%) had up to 3 days of duration of injury, followed by 3-7 days in 15 (25%) workers whereas 7 (11.7%) had >7 days of duration of injury.

DASH scoring findings showed that majority of the patients ($n=50$, 83.3%), had reported severe difficulty in writing, wash back ($n=43$; 71.7%), use knife ($n=40$; 66.7%), managing transport ($n=50$; 83.3%), recreational activities ($n=50$; 83.3%), arm pain (60; 100%), severe arm pain ($n=60$; 100%), sleeping ($n=60$; 100%), and less confident ($n=60$; 100%) [Table I]. The response of IES showed that quite a bit trouble staying asleep, felt irritable and angry, and trouble falling asleep was reported by 60 (100%) patients (Table II).

A moderate positive correlation was observed in between DASH score and IES score ($r: 0.503$, $p: <0.001$). Further stratification has revealed mild significant correlation of IES and DASH score for male

gender ($r: 0.483$, $p: <0.001$) and moderate significant correlation for married workers ($r: 0.578$, $p: <0.001$), >5 years of experience ($r: 0.663$, $p: <0.001$), whereas strong positive correlation was observed for crush injury ($r: 0.943$, $p: <0.001$) and puncture injury ($r: 0.970$, $p: <0.001$) [Table III].

DISCUSSION

Laborers are at highest risk of hand trauma. Hand trauma leads to inability or restricted hand movements and cause pain, dysesthesia and infection if not treated early.¹⁰ Previous studies have found strong association among anxiety disorder, depression, post-traumatic stress disorder and occupational injuries.¹¹ In the current study, the majority of the patients had reported severe difficulty in writing, wash back, use knife, managing transport, recreational activities, arm pain, severe arm pain, sleeping, and less confident. The response of IES-R showed that all the patients had reported quite a bit trouble staying asleep, felt irritable and angry, and trouble falling asleep.

According to the current study findings, a moderate positive correlation was observed in between DASH score and IES-R score. Thus, the findings reflect the fact that hand trauma is associated with negative emotions of the victims. In various previously published studies, the victims have complained disturbance in the sleep patterns, increase in daily nightmares, frequent flashbacks of the event, attention disorders, difficulty in return to work, and mood swings.¹²⁻¹⁵ A 10 years' follow-up study showed that victims continued to have symptoms even after 10 years of the accident. There was reported pain and limited functional movement and they required psychotherapy to cope with anxiety and post-traumatic impact.¹⁶ In addition to this, hand trauma can cause upsurge of intrusive and avoidance symptoms along with mood disorder. The victims also had emotional problems following trauma.⁶ The hand trauma cause delay in return to working increasing long term post-traumatic stress disorder symptoms.¹⁷

These findings suggest a long term care in these individuals even after their returning to the work place as most of the studies have been emphasized the need of assessment of psychological impact of return to work after occupational hand injury.^{18,19} In this regard, issues such as social stigma, support from co-workers and supervisor, as well as job security risk

TABLE I: FINDINGS OF DIFFICULTY IN PERFORMING SPECIAL TASK VIA DASH QUESTIONNAIRE (N=60)

Variables	Very Limited	Mild	Moderate	Severe	Unable to do
	n (%)	n (%)	n (%)	n (%)	n (%)
Open a tight or new jar	-	-	36 (60)	14 (23.3)	10 (16.7)
Write	-	-	-	50 (83.3)	10 (16.7)
Turn a key	-	-	46 (76.7)	14 (23.3)	-
Prepare a meal	-	-	46 (76.7)	14 (23.3)	-
Push open a heavy door	-	-	50 (83.3)	10 (16.7)	-
Place an object on a shelf above head	-	-	60 (100)	-	-
Heavy household chores	-	-	44 (73.3)	16 (26.7)	-
Garden	-	-	60 (100)	-	-
Make a bed	-	-	60 (100)	-	-
Carry shopping bag	-	-	31 (51.7)	29 (48.3)	-
Carry heavy object	-	-	31 (51.7)	11 (18.3)	18 (30.0)
Change lightbulb	-	-	47 (78.3)	13 (21.7)	-
Wash Hair	-	-	50 (83.3)	10 (16.7)	-
Wash back	-	-	17 (28.3)	43 (71.7)	-
Put Sweater	-	-	44 (73.3)	16 (26.7)	-
Use Knife	-	-	10 (16.7)	40 (66.7)	10 (16.7)
Recreational activities little effort	-	-	-	50 (83.3)	10 (16.7)
Recreational activities force	-	-	-	50 (83.3)	10 (16.7)
Recreational activities move arm	-	-	31 (51.7)	19 (31.7)	10 (16.7)
Manage transportation	-	-	-	50 (83.3)	10 (16.7)
Sexual activities	-	-	-	50 (83.3)	10 (16.7)
Past week social activities	-	-	50 (83.3)	-	10 (16.7)
Past week hand problem	60 (100)	-	-	-	-
Arm pain	-	-	-	60 (100)	-
Severity Arm pain	-	-	-	60 (100)	-
Tingling	-	31 (51.7)	29 (48.3)	-	-
Weakness Arm	-	31 (51.7)	13 (21.7)	16 (26.7)	-
Stiffness arm	-	-	42 (70.0)	18 (30.0)	-
Sleeping	-	-	-	60 (100)	-
Less confident	-	-	-	60 (100)	-

all matters a lot.^{18,19}

As per the current study findings, further stratification has revealed moderate significant correlation of DISH score and IES-R for male gender, married workers, more than 5 years of experience, whereas strong positive correlation was observed for crush injury, puncture and cut injuries.

As males are the one that are mostly responsible for labor works in Pakistan including in the factory, motor vehicle, uplifting, and construction, so the predominance of males in the study group is quite understandable. In addition to this, due to more risk taking behavior and physically hard nature of labor work, males are prone to injuries. In previous studies too males are reported as most vulnerable population for any occupational injury including hands.^{20,21}

The findings of the study could be highlighted in the light of limitation that this

was a single center study conducted on a limited number of samples. Furthermore, there is a need of high impact studies that include more confounding factors such as family size, financial support from the family, educational status, area of residence, any other financial resources, physical and health status before getting the hand trauma, and job security status. In addition to this, further studies are recommended that assess these patients in long term and evaluate their mental and physical health status as well the impact on the daily quality of life. This study has highlighted an important issue that will not only help the healthcare professionals in the effective management of the patients who suffers right hand trauma but also the impact will be on the management of patients with other occupational injuries too. A psychological and therapeutic interventional based study in these population will be an additional benefit to the cohort.

CONCLUSION

This study has revealed a considerable relationship of hand trauma and psychological impairment in patients with right hand trauma. There is a need to focus on the determination of the factors that are involved in the disturbance of mental health of these patients. Worker who have the right hand trauma due to crush, puncture or cut injuries, married and those having more than 5 years of experience should be considered as high-risk population for psychological impairment.

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TABLE II: FINDINGS OF IMPACT OF EVENT SCALE (N=60)

Variables	Not at all	A little bit	Moderately	Quite a bit	Extremely
	n (%)	n (%)	n (%)	n (%)	n (%)
Any reminder brought back feelings about it.	-	-	50 (83.3)	10 (16.7)	-
Had trouble staying asleep	-	-	-	60 (100)	-
Other things kept making think about it.	-	-	60 (100)	-	-
Felt irritable and angry	-	-	-	60 (100)	-
Avoided letting get upset when thought about it or was reminded of it.	-	-	44 (73.3)	16 (26.7)	-
Thought about it when didn't mean to	-	-	60 (100)	-	-
Felt as if it hadn't happened or it wasn't real.	-	7 (11.7)	53 (88.3)	-	-
Stayed away from reminders about it	-	13 (21.7)	-	47 (78.3)	-
Pictures about it popped into mind	-	7 (11.7)	53 (88.3)	-	-
Jumpy and easily startled	-	-	23 (38.3)	37 (61.7)	-
Tried not to think about it	-	-	23 (38.3)	37 (61.7)	-
Still had feelings about it but unable to deal	-	-	60 (100)	-	-
Feelings numb when think about it	-	-	60 (100)	-	-
Found acting or feeling like was back at that time	-	13 (21.7)	47 (78.3)	-	-
Trouble falling asleep	-	-	-	60 (100)	-
Waves of strong feelings	-	-	50 (83.3)	10 (16.7)	-
Tried to remove from memory	-	-	60 (100)	-	-
Trouble concentrating	-	-	60 (100)	-	-
Reminders of it caused to have physical reactions	-	6 (10.0)	54 (90.0)	-	-
Dreams about it	-	37 (61.7)	13 (21.7)	10 (16.7)	-
Watchful and on guard	-	44 (73.3)	16 (26.7)	-	-
Tried not to talk about it	-	-	60 (100)	-	-

TABLE III: CORRELATION ANALYSIS OF DASH SCORE WITH IES SCORE (N=60)

Variables		r	p-value
		Total (n=60)	0.503
Age (years)	≤45	0.015	0.944
	>45	0.663	<0.001
Gender	Male (n=56)	0.483	<0.001
	Female (n=4)	0.933	0.067
Marital Status	Married	0.578	<0.001
	Unmarried	-0.884	0.001
Work Experience	<2 years	-0.810	0.015
	2-5 years	-0.497	0.316
	>5 years	0.663	<0.001
Source of Injury	Crush	0.943	<0.001
	Cut	0.754	0.012
	Puncture	0.970	<0.001
Duration of injury	0-3 days	0.330	0.043
	3-7 days	0.718	0.003
	>7 days	0.898	0.006

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

NK : Concept and study design, acquisition of data, drafting the manuscript, approval of the final version to be published

US: Analysis and interpretation of data, critical review, approval of the final version to be published

FAA, MA & SB: Acquisition of data, drafting the manuscript, approval of the final version to be published

WS: Acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request



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