

ORIGINAL ARTICLE

Who are less likely to return to work after getting injured on duty? A 12-month epidemiological evaluation in an orthopedic and traumatology center in Hong Kong

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Abstract

Objectives: Cases of injury on duty (IOD) are common in Hong Kong, but literature on this group of patients is limited. This study aims to describe local IOD cases' epidemiological characteristics and identify factors affecting return to work (RTW) outcomes.

Methods: This is a retrospective epidemiological study of IOD patients in the orthopedic and traumatology center of Yan Chai Hospital in 2016, using the hospital's electronic clinical record analysis and reporting system; 323 out of the 10 730 patients (M:F = 206:117; mean age 46.9 ± 11.3) were included. Data on demographics, the injury episode, administrative procedures, treatment and rehabilitation were collected. Outcomes were measured by "RTW" and "time to RTW from injury."

Results: Around 80% of patients had a successful RTW and the mean time to RTW was 10.6 ± 9.0 months. Patients who were female, divorced or widowed and living alone in a public rental flat were less likely to RTW. Psychiatric consultations (OR 13.70, $P < .001$), legal disputes (OR 8.20, $P < .001$) and more than 5 months of waiting time for physiotherapy (OR 3.89, $P = .002$) were the strongest among the numerous risk factors for non-RTW. An increase in one visit to the general outpatient clinic and the presence of legal disputes had lengthened the time to RTW by 4.8 days ($P < .001$) and 18.0 months ($P < .001$), respectively.

Conclusions: Several demographic, psychosocial and administrative factors were negatively associated with RTW in the local population. Recommendations were made for healthcare providers and policymakers accordingly.

KEYWORDS

epidemiology, health policy, injury on duty, occupational health, orthopedics and traumatology, return to work, risk factors

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1 | INTRODUCTION

Cases of injury on duty (IOD) are common in Hong Kong. Every year, there were around 35 000 IOD cases reported to the Labor Department,¹ not to mention those trivial injuries which were not reported, making up to an incidence rate of around 1% of the working population per annum.² Workers alleged to have suffered from an IOD are protected by the Employee's Compensation Ordinance (ECO), Chapter 282 of the Laws of Hong Kong. Employees have the right to claim paid sick leaves within the first 2 years from the injury. Compensation is also granted in a lump sum for the medical expenses incurred and the degree of permanent disability sustained as determined by the Medical Assessment Board (MAB).³ In 2016, the average number of working days lost per case was 18.4 days, while the average compensation amount per case was HK\$12 299, both showing an increasing trend.⁴

Despite being a common condition, literature studying the local IOD conditions are limited. Our current understanding of the issue depends mainly on the official statistical figures from the Labor Department and the Census.^{12,19} However, the data have been underused as their subsequent analysis have been lacking from researchers. This study provides a full review on the all-cause IOD in Hong Kong, with evaluation ranging from epidemiology, the injury pattern, relevant administrative procedures to treatment and rehabilitation.

In Hong Kong, an orthopedic and traumatology (O&T) department in the Hospital Authority accepts referral from private general practitioners and O&T doctors, public general outpatient clinics (GOPC) and accident and emergency departments (A&E) for IOD cases with musculoskeletal complaints. Most IOD patients turn out to be treated and followed up in O&T centers in public hospitals, especially for those who require prolonged sick leave periods. Doctors in the private sector tend to divert these cases to avoid legal liability. A formal evaluation of this group of patients and their management pathway in the public healthcare system is worth the effort to identify any loopholes and inadequacies in the system so that the policy issues can be better prepared to be put forward onto the government agenda once a policy window is ready sooner or later in future.⁵ Not only can such an evaluation fill up the piece of knowledge gap in our locality, but it can also serve as evidence on which healthcare providers and policymakers can base when they are formulating policies for system perfection and better resource allocation.

Whether or not a patient finally returns to work (RTW) after an IOD is an essential indicator of the rehabilitation success. Previous studies have identified various epidemiological and psychosocial factors, which significantly affect RTW outcomes.⁶⁻¹⁷ For example, Clay et al reported factors like older age, blue-collar work and receipt of compensation as determinants of non-RTW in a prospective cohort study.⁶

A recent systematic review by Etuknwa et al found that age, education level, self-efficacy were more consistently affecting RTW outcomes.⁷ Building upon these previous studies, this study is conducted using the local data and attempts to answer the following research questions: What are the epidemiological characteristics of the group of patients who got injured on duty and were cared for by a public hospital? Who are the ones less likely to return to work? Are any of these risk factors modifiable by administrative means? How is the local IOD condition different from foreign countries?

2 | METHODS

This is a retrospective epidemiological study conducted in the O&T Department of Yan Chai Hospital, Hospital Authority, Hong Kong.

2.1 | Study design

The target group was all patients followed up for IOD in the department's specialist outpatient clinics from January to December 2016. Using the electronic "Clinical Data Analysis and Reporting System" (CDARS), samples were collected from all patients aged 18-65 who had a record of visit(s) to the "fracture clinic," "discharge clinic," "general clinic," "fast track clinic" or "sub-specialty clinic" of the department.

Out of the 10 730 cases retrieved from CDARS, 334 of them were recorded as IOD cases. Eleven cases were excluded for early loss of follow up before RTW outcomes were determined. The remaining 323 cases were included without further selection, and their demographic data, electronic medical records and records of the allied health were reviewed to retrieve the data required.

2.2 | Definition and validation of variables

IOD cases were defined as those reported to the Labor Department within 14 days from the injury, either by the patient or his employer. This procedure was verified and recorded on the electronic medical record by the attending doctor in a set of template questions upon the first attendance to our clinic. The patient's occupation, date, site and mode of injury were also recorded in the same consultation session.

"RTW" was defined as having returned to full-time pre-injury employment or full-time alternate employment, recorded by the attending doctor in the subsequent follow-up appointments.

Patient's demographic data were recorded upon first registration to the electronic clinical management system

(CMS) of the Hospital Authority, while records of operation(s), hospitalization, attendance to GOPC, psychiatrist, physiotherapist and occupational therapist in the public sector were all documented and shared within the CMS.

MAB means an Employees' Compensation Board appointed under section 16D, Chapter 282, ECO, Laws of Hong Kong.³ The board comprises one representative from the Labor Department (a senior Labor Officer or Labor Officer), and two registered medical practitioners responsible for assessing the validity of each IOD case and the percentage of permanent disability (PD) incurred. The amount of compensation payable is determined according to this percentage of PD and the worker's pre-injury earnings and age, which is proportionate to the loss of future earning capacity caused by that injury. The employee holds the right to appeal to the decision made by the first MAB, after which the case will be reviewed by a second MAB, and the final compensation amount will be determined. Under normal circumstance, the employer, after receipt of the certificates of assessment and claim, is legally bound to make the specified compensation. In case of objection to the judgment, in terms of case validity or compensation amount, either party shall raise an appeal to the District Court, which may confirm or reverse any decision, or confirm or vary any assessment made there before. "Legal disputes" in the current study is defined as cases that had been brought up to the Court for appeal.

2.3 | Outcome measures

The primary outcome was "RTW" after the IOD. The secondary outcome was "time to RTW from injury."

2.4 | Sample size calculation

Sample size calculation was performed using the method by Daniel¹⁸ for population proportions. Taking the number of IOD cases in Hong Kong as 35 000¹ and an assumed proportion of IOD cases with successful RTW as 72%,⁸ the sample size required to attain a 95% significance level within a 5% margin of error was 308.

2.5 | Data and statistical analysis

All statistical analysis was performed by IBM SPSS software (version 26.0; IBM Corporation). Multivariate logistic regression was performed to determine the significance and calculate the adjusted odds ratio of risk factors for "non-RTW," adjusted for age, sex and race. Multiple linear

regression was performed to determine the significance of factors affecting "time to RTW from injury." Statistical significance was taken for P -value $< .05$. Numerical results were shown in mean \pm standard deviation (range) unless otherwise specified.

3 | RESULTS

3.1 | Overview of catchment area

Yan Chai Hospital is the only public hospital in Tsuen Wan district (male: 45.9%, median age 43.2, Chinese: 93.3%) of Hong Kong, serving its over 310 000 residents. In 2016, 52.9% of the residents were among the working population (HK: 51.2%), and their median monthly income from primary employment was HK\$15 380 (HK: \$15 500); 46.6% of the residents reported being employees (HK: 45.4%); 9.5% reported being construction site workers (HK: 8.5%), 9.2% were transportation-related workers (HK: 8.8%), and 4.3% were manufacturing workers (HK: 3.8%). (*By-census 2016*).²

3.2 | Primary and secondary outcomes

A majority of cases (80.5%) had a successful RTW. The mean time to RTW from injury was 10.6 ± 9.0 months. Among the 260 RTW patients, 8.8% of them had sought alternate full-time employment (Table 1).

3.3 | Risk factors for non-RTW

Demographically, female sex (OR 1.91, $P = .025$), divorced or widowed (OR 4.90, $P = .003$), living alone (OR 4.44, $P = .017$), living in public rental flat (OR 2.19, $P = .019$) and current smokers (OR 2.62, $P = .039$) were associated with non-RTW (Table 2).

As shown in Table 3, patients who sustained back injury were less likely to RTW (OR 3.42, $P < .001$). In contrast, those who suffered from hand injury were more likely to RTW (OR 0.17, $P = .001$). The presence of fracture was, unexpectedly, associated with a better chance to RTW (OR = 0.44, $P = .007$). The patient's occupation and mode of injury did not significantly affect the RTW outcome.

TABLE 1 Primary and secondary outcomes (N = 323)

Outcome	No.	%
Return to work	260	80.5
Time to RTW from IOD (months)	10.6 \pm 9.0 (0-62)	
Change job (among 260 RTW patients)	23	8.8

Abbreviations: IOD, injury on duty; RTW, return to work.

Characteristics	No.	%	Adjusted OR	95% CI	<i>P</i>
Age group (years)					
18-25	21	6.5	—	—	.783
26-35	34	10.5			
36-45	70	21.7			
46-55	116	35.9			
55-65	82	25.4			
Mean age (years)	46.9 ± 11.3				
Sex					
Female	117	36.2	1.91 (female sex)	1.08-3.36	.025
Male	206	63.8			
Race					
Chinese	307	95.0	—	—	.679
Pakistani	10	3.1			
Napoli	3	0.9			
Indian	3	0.9			
Marital status					
Never married	68	20.9	4.90 (divorced/widowed)	1.72-14.08	.003
Married	234	72.5			
Divorced	15	4.7			
Widowed	5	1.9			
Education level					
Primary or below	103	32.0	—	—	.789
Secondary	212	65.5			
Tertiary or above	8	2.5			
Living alone	15	4.6	4.44	1.31-14.93	.017
Living in public rental flat	205	63.5	2.19	1.14-4.20	.019
Immigrants after 2011	27	8.4	0.70	0.23-2.12	.527
Current Smokers	94	29.2	2.62	1.05-6.52	.039
Previous IOD	35	10.8	1.56	0.68-3.56	.291

Values are bolded for $P < 0.05$.

Administrative procedures found to reduce the chance of RTW included the presence of legal disputes (OR 8.20, $P < .001$), second MAB (OR 3.50, $P = .001$) and attendance to GOPC (OR 2.38, $P = .005$; Table 4).

Table 5 describes the treatments received by the patient after IOD. Psychiatric consultation was the strongest risk factor for non-RTW identified in this study (OR 13.70, $P < .001$). Patients who waited more than 5 months from injury before starting physiotherapy were also less likely to RTW (OR 3.89, $P = .02$). Operations performed (major or minor) and time to start occupational therapy, on the other hand, did not affect the chance of RTW.

TABLE 2 Demographic characteristics of study subjects and their association with non-RTW (N = 323)

3.4 | Factors lengthening time to RTW from injury

By the method of multiple linear regression, two factors were identified in a regression model (adjusted $R^2 = 0.617$), which predicts a longer time to RTW, as shown below:

3.4.1 | Number of GOPC visits

Increase in one visit to GOPC, on average, lengthened 4.8 days (95% CI [2.6, 7.1], $P < .001$) of time to RTW.

TABLE 3 Patient occupation, pattern and severity of injury and their association with non-RTW (N = 323)

Categories	No.	%	Adjusted OR	95% CI	P
Occupation					
Construction site workers ^a	100	31.1	—	—	.173
Manual workers ^a	59	18.3			
Cleaners	26	8.1			
Other elementary occupations ^b	26	8.1			
Transportation	24	7.5			
Services	22	6.8			
Food industries	21	6.5			
White collars	13	4.0			
Logistic workers	9	2.8			
Healthcare workers	6	1.9			
Discipline services	5	1.6			
Manufacturing	5	1.6			
Others ^c	6	1.9			
Site of injury					
Hand	84	26.0	0.17	0.06-0.48	.001
Back	54	16.7	3.42	1.77-6.62	<.001
Foot and ankle	50	15.5	1.20	0.57-2.53	.635
Wrist	43	13.3	1.39	0.57-3.37	.472
Knee	26	8.0	0.74	0.28-1.98	.553
Shoulder	18	5.6	2.36	0.52-10.70	.266
Other upper limb miscellaneous	18	5.6	1.96	0.43-8.88	.381
Neck	17	5.3	2.79	0.98-7.87	.054
Other lower limb miscellaneous	13	4.0	0.77	0.20-2.95	.707
Mode of injury					
Slip and fall	90	27.9	—	—	.300
Cut/crush	67	20.7			
Hit by object	53	16.4			
Fall from height	39	12.1			
Inversion injury (ankle/foot)	21	6.5			
Sprain injury (back/neck/wrist)	21	6.5			
Heavy weight lifting	14	4.3			
Road traffic accident	14	4.3			
Others ^d	4	1.3			
Presence of fracture	174	53.9	0.44	0.25-0.80	.007

^aConstruction site workers are reported separately from manual workers given their significant proportion in the sample.

Values are bolded for $P < 0.05$.

^bOther elementary occupations include security guard, gardener, janitor, sailor, postpartum career and homer helper.

^cOthers include teacher, engineer, postman and film maker.

^dOthers include scald and explosion injuries.

Categories	No.	%	Adjusted OR	95% CI	P
GOPC attendance (at least 1 visit)	72	22.3	2.38	1.29-4.39	.005
GOPC frequency (times)	21 ± 33 (1-225) ^a				
MAB					
No	67	20.7	0.98	0.49-1.95	.961
One time	219	67.8	0.51	0.29-0.91	.022
Two times	37	11.5	3.50	1.67-7.30	.001
Time of first MAB from injury (months)	13.3 ± 8.4 (1-67)				
MAB % PD	2.4 ± 1.6 (0-6)				
Legal disputes	23	7.1	8.20	3.39-20.41	<.001
Hospital admission	243	75.2	0.69	0.37-1.27	.233
Length of stay (days)	3.9 ± 4.3 (0-31)				
Length of stay more than 1 week	29	9.0	1.77	0.73-4.27	.204

Abbreviations: GOPC, general outpatient clinic; MAB, medical assessment board; % PD, percentage of permanent disability.

Values are bolded for $P < 0.05$.

^aMedian ± interquartile range (range).

TABLE 4 Relevant administrative procedures after IOD and their association with non-RTW (N = 323)

TABLE 5 Treatments received after IOD and their association with non-RTW (N = 323)

Categories	No.	%	Adjusted OR	95% CI	P
Operation done	82	25.4	0.79	0.40-1.55	.486
Major OT (GA or SA)	53	16.4	1.66	0.81-3.41	.166
Psychiatry consultation	49	15.2	13.70	6.62-28.57	<.001
Time of first PSY consultation from IOD (months)	21.3 ± 3.7 (2-54)				
Psychiatric diagnosis ^a					
Depression	28	48.3	13.16	5.21-33.33	<.001
Adjustment disorder	10	17.2	4.76	1.31-17.54	.018
PTSD	5	8.6	15.38	1.62-142.86	.018
Anxiety	4	6.9	3.91	0.53-29.41	.182
Dysthymia	4	6.9	1.23	0.12-12.35	.861
Others ^b	7	12.1	3.40	0.73-15.87	.120
Physiotherapy	211	65.3	2.23	1.14-4.34	.019
Waiting time for PHY session (months)	3.0 ± 3.7 (0-31)				
5+ months waiting time for PHY	26	12.3 ^c	3.89 ^c	1.62-9.34	.002^c
Occupational therapy	194	60.1	1.35	0.75-2.41	.314
Waiting time for OCCT session (month)	5.2 ± 5.8 (0-24)				

Abbreviations: GA, general anesthesia; OCCT, occupational therapy; OT, operation; PHY, physiotherapy; PSY, psychiatry; PTSD, post-traumatic stress disorder; SA, spinal anesthesia.

Values are bolded for $P < 0.05$.

^aNine patients had mixed psychiatric diagnoses.

^bOthers include psychosis, sleep disorder, obsessive compulsive disorder and alcohol dependence.

^cAmong patients who received physiotherapy.

3.4.2 | Legal disputes

The presence of legal disputes, on average, increased the time to RTW by 18.0 months (95% CI [11.2, 24.8], $P < .001$).

4 | DISCUSSION

IOD was not uncommon in Hong Kong. The total number of working populations as reported by the By-census 2016 was 3 756 612,² while the number of reported occupational injuries in 2016 was 35 768,¹⁹ giving a yearly population prevalence of around 1%. In our sample involving patients seen in our orthopedic clinics in the same year, the yearly prevalence was around 3%, a rate higher than the general population. This can be explained by the fact that the O&T department in a public hospital accepts referrals of IOD cases from private practitioners, GOPC and A&E for any patient living in the respective district. Complex IOD cases or those that require multidisciplinary rehabilitation services are therefore concentrated in such O&T centers as ours.

Studies in foreign countries have shown strong associations between the success of RTW and several psychological, motivational and socioeconomic factors.⁶⁻¹⁷ However, most of these studies were based on the populations in Western countries. Locally, a study by Rajesh Garg et al²⁰ described the epidemiology of occupational hand injuries in a tertiary orthopedic center in Hong Kong, but the study focused on hand injuries only. Few studies addressed service fragmentation between doctors and allied health workers in managing IOD cases in public hospitals in Hong Kong and evaluated their proposed programs, applying the case management approach.²¹⁻²³ Nevertheless, their focus was on program evaluation rather than patient epidemiology or risk factor identification. This study draws an overall picture of the characteristics of all-cause IOD cases and explores risk factors specific to Hong Kong and its unique social, cultural and healthcare environments.

4.1 | Epidemiology

In our study, females had almost twice the risk as males for non-RTW following an IOD. This could be due to the traditional culture in Hong Kong and the Chinese population where males are considered the “bread-winners” of the family²⁴; therefore, females may have better flexibility to assume the role of a full-time family carer after the injury. Several significant social factors were identified. Lack of social support, such as being divorced/widowed and living alone, had a strong association with non-RTW. Such findings were consistent with foreign studies, which suggested family support as a facilitator of RTW, as family members are an important

source of emotional support and practical assistance during rehabilitation (such as helping out with household chores and preparing ice or heat pads).^{25,26} The patient’s age, which was found to be a significant risk factor by various previous studies, had no significant effect on RTW outcomes in our study population.^{6,7} Being current smokers had shown a slightly increased risk of non-RTW (OR 2.62, $P = .039$). However, the proportion of smokers in our sample (29.2%) was far higher than the population proportion (HK data: 10.8% in 2017).²⁷ It is postulated that the crude odds ratio was confounded by certain social factors. When controlled for two additional factors “living alone” and “living in public rental flat,” being smokers had lost its statistical significance as a risk factor for non-RTW ($P = .084$).

Quite contrary to our common thoughts, the severity of the injury, in itself, did not significantly affect the patient’s chance of RTW. Need for hospitalization, more than one week of inpatient treatment, major operations performed, more than 3% of PD granted and presence of fracture were considered indicators of more severe cases. Neither of these factors was associated with non-RTW. Interestingly, if the injury severity did not determine the chance of RTW, what did? Gard suggested that motivational factors at individual, job and rehabilitation levels were important for a successful rehabilitation outcome.²⁸ Dekkers-Sánchez et al²⁹ also suggested that work motivation, positive expectations about recovery, self-confidence, etc. were promoting factors for RTW. In a systematic review, *Iles* et al found out that recovery expectation was a robust predictor of RTW.³⁰ In our study, patients with fracture even had a surprisingly LOWER risk of non-RTW. A postulated reason is that fracture cases tended to seek medical advice early and the treatment endpoint was relatively clear and straightforward. With radiological evidence of fracture healing, which was perceived as “good recovery” by most patients, it was easier for doctors and therapists to encourage them to participate in the subsequent physical training, work hardening and work trial. RTW was imminent when a physically fit body couples with good confidence and motivation.

Patients with back injury had more than three times the risk of non-RTW in our study. This agreed with the findings of previous studies, which had shown a consistent association of back pain with absence from work.³¹⁻³³ The development of chronic back pain is a complex interplay of mechanical, psychological and social factors, but many patients had a lack of insight into the latter two. Once the pain was perceived as “untreatable,” it could have greatly shattered the patient’s self-efficacy in returning to pre-injury health and duties. Neck injury might also be a potential strong predictor, yet its significance was not established probably due to its small case number in the sample ($n = 17$, OR 2.79, $P = .054$). Those who sustained hand injury were more likely to RTW. Postulated that a significant proportion of these cases were

caused by simple cut/crush injuries, prompt recovery was achieved with proper wound management.

Previous studies had proposed that the longer the sick leave period, the less likely the patient could RTW due to reasons like inactivity, social isolation and psychological diseases during their sick leave period.^{34,35} Therefore, some administrative procedures were inevitably associated with non-RTW, given their intrinsically lengthy and time-consuming nature. For example, those who objected to the decision by the first MAB and thus needed extra procedural time for a second MAB had experienced more than tripled the risk of non-RTW in the current study. This was echoed by the findings by Grant et al,³⁶ where an increased number of medical assessments and delay in compensation claims were associated with higher levels of stress, which subsequently translated into more inferior long-term disability score and quality of life.

Having legal disputes had remarkably increased the risk by eight times. In cases of a claim for “personal injuries” under the *common law of Hong Kong*, claims can be made for “pre-trial loss of earning” and “future loss of earning,” where an inability to RTW can make up a greater amount of “loss” in monetary terms. Not returning to work could have been a strategic choice rather than simply due to incapability. For those who ever had legal proceedings and finally successfully returned to work, their time to RTW had been lengthened, on average, by 18 months, a period which could have caused a significant amount of loss at individual, familial and social levels.^{35,37,38} Nevertheless, legal disputes were mainly patient-dependent and not readily modifiable through administrative means by healthcare providers.

4.2 | Clinical practice and healthcare policies

The GOPC is another gateway for patients with IOD to enter the public healthcare system, besides the A&E. Around 20% of patients had a history of visit(s) to GOPC chiefly for their current IOD incident. This group of patients had a more than a two-fold increased risk of non-RTW. Besides, any one visit to GOPC had, on average, lengthened the time to RTW by 4.8 days. It is postulated that with the current policy in GOPC, where four days of sick leave are granted at maximum at each visit, patients are required to attend the clinic very frequently to extend their sick leave periods. Such an arrangement was inconvenient, clumsy and could have created an extra burden to those who were physically incapacitated following the injury. Rather than focusing on rehabilitation, such frequent visits would have distracted the patients to the troublesome administrative side of the story, not to mention the embarrassment and psychological stress they faced during these routine and excessive visits. It is understandable

that for minor IOD cases where prompt recovery and RTW are expected, cases can be solely followed up and discharged by GOPC. However, for cases where multidisciplinary rehabilitation services are warranted, an early referral to a specialist O&T center is recommended.

It had been well established that psychiatric symptoms were negatively associated with RTW.¹⁴⁻¹⁷ Depression and post-traumatic stress disorder were the most commonly identified risk factors.¹⁴ P Ash and Goldstein¹⁵ reported a striking odds ratio of 31 for non-RTW in patients with moderate to severe depression when compared to those less severe ones. The findings of this study agreed on these observations. Patients who had a record of visits to a psychiatrist in the public sector had 13 times increased risk of non-RTW. The top three diagnoses were depression, adjustment disorder and PTSD, and they were all significantly associated with non-RTW. This was readily explainable as loss of mood, motivation and interest in most daily activities were among the prime features of these psychiatric diagnoses. Post-injury depression or anxiety could lead to persistent pain, which might have further aggravated the problem by forming a vicious circle.³⁹ A timely diagnosis and treatment were therefore pivotal in promoting RTW.

Nonetheless, the waiting time for psychiatric consultation in our sample was as long as 21.3 months. Reported figures for depression and PTSD following IOD could be as high as 43% and 55%, respectively from the previous studies.¹⁴ The reported figure in our sample was 15.5% for all psychiatric diagnoses. Our patients were very likely to be underdiagnosed and undertreated due to lack of awareness of attending doctors, short consultation time, patient's lack of insight and reluctance to psychiatric treatment. It is recommended that apart from dealing with physical complaints and bodily assessment, doctors should actively screen for patients with potential psychiatric needs. Examples of such are as simple as asking questions like “how's your mood and sleep recently?,” “would you feel stressed when you think about the scene of injury again?,” etc. Prompt referral to a psychiatrist or clinical psychologist should be made for potential cases.

Around two-thirds of patients received at least one course of physiotherapy, and the mean waiting time was 3.0 months. It was found that for patients with more than five months of waiting time, the risk of non-RTW had been increased by almost four times. A proposed explanation was that delayed start of rehabilitation sessions had resulted in a period of inactivity and idleness before the training commenced, which could lead to deterioration of patient's physical fitness, diminished motivation for training and rehabilitation and subsequent loss of confidence to successful RTW. In case chronic pain developed following delayed management of the initial injury, the chance of RTW could have been further jeopardized.⁴⁰ A timely referral to a physiotherapist should

be made as soon as the patient is deemed physically fit for training. Many a time referral letter can be sent out BEFORE the patient is totally “fit” or before a fracture has fully healed to incorporate the healing time into the total waiting time. On the policy side, the commencement of physiotherapy session within five months from injury should be set as a key performance indicator. Law et al²¹ reported superior RTW outcomes in their MORE program group, where patients were ensured with timely therapist service through coordination by a case manager. Although the benefits of a case management approach are beyond the evidence drawn by this study, the benefits shown by timely physical training have coincided in both studies. While most IOD patients need to compete for public resources with other general patients, it has led to unnecessary delays and prolonged sick leave due to long waiting time for therapist consultations. Therefore, it is recommended that policymakers establish a priority program for physiotherapy centers to accommodate the earliest training sessions for IOD patients, as matched with the doctor’s assessment and recommendation.

4.3 | Limitations

The authors recognize the limitations of the study. Its retrospective nature has inevitable intrinsic biases. Without prior grouping or randomization, the results of the analysis are observational and explorative. However, it can serve as a direction for future causative or interventional studies, basing on the several strong associations observed. Data from a single center may not fully represent the IOD conditions in Hong Kong. A multi-center study can undoubtedly improve the validity. This study was conducted using the data available on the electronic medical records of the Hospital Authority. Therefore, medical/psychiatric/allied health services received in the private sector were not included. It must be recognized that policy recommendations were drawn based on the findings of the local data in Hong Kong and may not be fully applicable in healthcare systems elsewhere in the world. Readers should interpret and apply with care.

5 | CONCLUSIONS

Around 80% of patients had a successful RTW following the IOD. Patients who were female, divorced or widowed and living alone in a public rental flat were less likely to RTW. Psychiatric consultations, legal disputes and more than five months of waiting time for physiotherapy were the strongest among the numerous psychosocial and administrative risk factors for non-RTW. The number of GOPC visits and legal

disputes were independent predictors for a longer time to RTW. Recommendations were made accordingly for healthcare providers and policymakers.

DISCLOSURES

Ethical approval: Approval was obtained from the local institutional review board. *Informed consent:* N/A. *Registry and Registration number of the study:* KWC-REC reference: KW/EX-19-105(142-08). *Animal studies:* N/A. *Conflict of interest:* The authors had not received any funding and had no competing interests to disclose.

AUTHOR CONTRIBUTIONS

DW: study design, data collection and analysis, manuscript writing. AK: study design, data analysis, critical revision. YCW: critical revision

DATA AVAILABILITY STATEMENT

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

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