CONSTRUCTION INDUSTRY COUNCIL
建造業議會

PILOT MEDICAL EXAMINATION SCHEME FOR CONSTRUCTION WORKERS

RESEARCH SUMMARY

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Published by

Construction Industry Council,
Hong Kong SAR

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FOREWORD

The Construction Industry Council (CIC) was established on 1 February 2007 in accordance with the CIC Ordinance (Cap. 587). Since its establishment, the CIC has put much focus the occupational health and safety (OHS) of construction workers. We have established the Committee on Construction Safety drawing representatives from government, academia and industry stakeholders. We hope to integrate the efforts of all the stakeholders to improve the OHS performance of the construction industry in Hong Kong.

It is well known that the construction industry is labor-intensive and physically demanding, which leads to lots of health problems for construction workers. To prevent these problems, it is crucial to obtain the health profile of construction workers. The CIC has engaged Prof. Albert CHAN from the Hong Kong Polytechnic University to carry out the study to establish the health profile of construction workers. The research team has done a large amount of work in data collection, on-site interviews, analysis and interpretation of information to produce a solid, well presented and comprehensive research report.

In the report, the demographic characteristics, health problems, and lifestyle behaviors of the construction workers in Hong Kong are given. The influences of the demographic characteristics and lifestyles on health are also presented. Based on the findings, the research team has proposed some practical recommendations to improve the health of construction workers.

This report provides a good framework for the industry to derive enhanced welfare service in the construction industry to improve construction worker's health conditions. The CIC would like to collaborate closely with all industry stakeholders, to implement these recommendations. This study cannot succeed without the dedication and devotion of the members in the research team and their contributions are gratefully acknowledged.

Ir Albert CHENG
Executive Director
Construction Industry Council

PREFACE

The construction workforce in Hong Kong is aging and in severe shortage. To tackle this problem, it is crucial to retain the existing workforce and at the same time to recruit more new blood. However, work-related health problems may lead to early retirement and loss of ability to work, particularly in some physically demanding tasks, which are very common in the construction industry. Therefore, an early detection of health problems of construction workers may be an effective means to provide treatment and preventive measures before the problems crystalized. It may also project a good and caring image of the industry, thereby attracting more young workers to join the construction industry.

A multi-disciplinary research team led by Ir Prof. Albert CHAN with inputs from the Hong Kong Polytechnic University and the Hong Kong Education University was commissioned to explore the feasibility of health profiling in the construction industry. The pilot study reported that some lifestyle behaviours may affect the cardiovascular health and exercise may prevent and relieve the pain symptoms.

This pilot study is the first of its kind in the construction industry. Further studies should be conducted to establish a longitudinal health profiling of construction workers with more in-depth health assessment at a larger scale, industry-wide level.

Ir Prof. Albert P.C. CHAN
Head of Department of Building and Real Estate
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RESEARCH HIGHLIGHTS

Methods

The research team interviewed and collected health data from 941 construction workers on 47 sites. Physical health was assessed by taking blood samples and measuring weight and height. Socio-demographic characteristics and lifestyle behaviors were measured by interviews. Descriptive statistics were performed to describe the distribution of socio-demographic characteristics, physical health (pain symptoms, obesity, blood pressure and glucose, heart rate, and liver and renal functions), and lifestyle behaviors. Then, the t-test, one-way ANOVA, chi-square test and non-parametric correlation were applied where appropriate to compare the health conditions by demographic characteristics and lifestyle behaviors.

Findings and Discussion

The blood chemistry (fasting blood glucose, total cholesterol, and renal and liver functions) and blood pressure in construction workers was comparable to the general population in Hong Kong; however, the prevalence of obesity may be higher than the general population (62.6% vs. 39.0%) possibly due to the limitation of BMI, which may be over-estimated in muscular individuals. One-quarter of workers reported pain experience with the most frequent pain management as 'ignoring the pain.'

Very few construction workers consumed sufficient amount of fruit and vegetables (7.9%) and dairy product (2.0%) which were less than the general population. Smoking (Daily smokers: 41.2%) and alcohol consumption (Daily drinkers: 11.7%) were common for construction workers and more frequent than the general population. Additionally, leisure-time physical activity (4 times or more a week: 12.0%), warm up (50.1%) and cool down (14.5%) before and after work were not common.

Overall, older, female and less educated workers were more susceptible to cardiovascular risk factors and pain experience. Despite little associations between lifestyle and health condition in the present study [e.g. i) alcohol consumption with hypertension and obesity, ii) sleep with normal weight status, iii) warm-up before work and sufficient amount of leisure-time physical activity with pain symptoms], substantial evidence supports that reduced substance use, fruit and vegetable intake, physical activity, normal weight status and blood pressure could reduce the risk of cancers and/or cardiovascular diseases. In addition, leisure-time physical activity and warm-up before work may prevent injuries. It is important to promote healthy lifestyle and design tailor-made interventions for female, older, and less educated workers who were more vulnerable to cardiovascular problems and injuries.

CONTENTS

1 INTRODUCTION

1.1 Background

In Hong Kong, the construction workforce is aging and in shortage (Ng & Chan, 2015). To relieve the shortage of workforce, it is important to retain the old workers and to attract the young ones. However, work-related health problems could lead to early retirement and job loss (Schuring, Burdorf, Kunst, & Mackenbach, 2007). Health profiling may be helpful for retaining the workers by detecting the health problems at the early stage and giving groundwork to provide treatment and prevention as soon as possible. It also provides a positive image of the construction industry and hence, may attract young workers. However, there is no such health profiling for construction workers in Hong Kong. The present project evaluated the feasibility of establishment of health profiling specific for the construction industry.

1.2 Aims and Objectives

1) To detect health problems at an early stage so as to take appropriate actions before the problems crystalized;

2) To identify the compatibility between the health of workers and the working conditions;

3) To analyze construction workers' general health conditions in terms of their gender, age, and work trades;

4) To provide useful information for enhancing future works on the welfare services in the local construction industry.

1.3 Scope

The scope of the project is to develop a health profiling specific for construction workers and to improve the well-being of construction workers.

2 RESEARCH METHODOLOGY

2.1 Sample and Procedures

Between July 2014 and early December 2015, the research team interviewed and collected data from 941 construction workers drawn from 47 sites. The health survey included workers' demographic information as well as BMI, pain experience, dietary and exercise habits. Blood sample test was also performed by the Hong Kong Federation of Trade Unions (HKFTU) Workers' Medical Clinics to examine the health condition of the workers, including blood pressure and heart rate, glucose, cholesterol, liver function, uric acid and renal function.

2.2 Statistics Analyses

For objectives 1 and 2, descriptive statistics were used to describe the demographic characteristics of the construction workers, their health conditions (including pain symptom, weight status, heart rate, blood pressure and chemistry), and lifestyle behaviors. For objectives 3 and 4, chi-square tests, t-test/one-way ANOVA or non-parametric correlations were performed where appropriate to compare the health conditions by demographic characteristics (age, gender, education and race) and lifestyle behaviors.

3 RESEARCH FINDINGS AND DISCUSSION

3.1 Demographic

Eighty-seven percent of the participants were male with 66% aged 40 years or above (Table 1). Almost all of the participants were Chinese born in Hong Kong (89.4%) or Mainland China (9.3%). About a quarter of the participants had not received formal education or only received primary education and about 60% received secondary education. The common work classifications were general labour (39.8%) followed by electrical labour (16.7%), technicians (8.4%), foremen (5.8%) rigger (4.9%), levelers (4.5%), machine operator (3.8%), plaster (2.9%), welders (2.8%), and steel worker (2.4%) and remaining classification less than 2% each.

Table 1 Demographic characteristics of the participants (N=941)

Demographic	Frequency (N)	%
Age		
20-29	141	15.0
30-39	173	18.4
40-49	220	23.4
50-59	306	32.5
Above 60	101	10.7
	Mean	SD
Age (in years) (N=941)	45.1	12.1
Gender		
Male	814	86.8
Female	124	13.2
Race/Residential status		
Hong Kong	839	89.4
Mainland China	87	9.3
Nepal	5	0.5
Pakistani	5	0.5
Others	2	0.2

Table 1 Demographic characteristics of the participants (N=941)

Demographic	Frequency (N)	%
Education		
No formal education/ primary education	250	26.7
Junior secondary education	349	37.3
Senior secondary education	233	24.9
Post-secondary education -diploma, associate, degree	103	11.0
Trade categories		
General labour	317	39.8
Electrical labour	133	16.7
Technicians	67	8.4
Foremen	46	5.8
Rigger	39	4.9
Levellors	36	4.5
Machine operator	30	3.8
Plaster	23	2.9
Welders	22	2.8
Steel worker	19	2.4
Plumbing worker	15	1.9
Rebar worker	15	1.9
Drainage worker	10	1.3
Painter	11	1.4
Scaffolder	4	0.5
Carpenter	4	0.5
Waterproofing	3	0.4
Diver	2	0.3

3.2 Health Problems

The prevalence of high fasting blood glucose, total cholesterol, hypertension, and obesity were 5.2%, 6.6%, 38.6%, and 62.6% (overweight: 44.5% and obese: 18.1%), respectively (Table 2). Hypertension and obesity were quite common for construction workers. Few participants had abnormal renal and liver functions with the prevalence of high urea, uric acid, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) level of 4.0%, 6.8%, 3.6%, and 4.7%, respectively. One-quarter of workers reported pain experience with average (SD) number of pain spots of 2.3 (1.6) and the most frequent pain management was 'ignoring the pain' (41.7%) (Table 3). The pain was mostly in the lower back, shoulders, and knees (Please refer to Figure 1 for the painful locations). The workers also reported the most painful spot as lower back, shoulders, and knees.

Table 2 Weight status, blood pressure, and blood test results

	Frequency (N)	%
Heart rate		
Slow (<60)	46	5.0
Normal (60-100)	843	91.2
Fast (>100)	35	3.8
Cholesterol		
Normal (<5.2mmol/L)	610	65.8
Borderline high (5.2-6.2mmol/L)	256	27.6
High (>6.2mmol/L)	61	6.6
Blood pressure		
Normal (<120/80)	166	18.0
Prehypertension (systolic 120-139 or diastolic 80-89)	401	43.4
Hypertension (≥140/90)	357	38.6
Weight status		
Underweight (<18.5)	25	2.7
Normal weight (18.5-23)	323	34.7
Overweight (<23-27.5)	415	44.5
Obese (>27.5)	169	18.1

Table 2 Weight status, blood pressure, and blood test results

	Frequency (N)	%
Fasting blood glucose (N=710)		
Normal (<6.1mmol/L)	655	92.3
Impaired glucose tolerance (6.1-6.9mmol/L)	18	2.5
Diabetes (≥7mmol/L)	37	5.2
Random blood glucose (N=217)		
Normal (≤7.0mmol/L)	184	84.8
High (>7mmol/L)	33	15.2
Urea		
Low (<3.0 mmol/L)	4	0.4
Normal (3.0-8.0 mmol/L)	886	95.6
High (>8.0 mmol/L)	37	4.0
Uric Acid		
Low (M: <208 mcmol/L ;F: <149 mcmol/L)	9	0.9
Normal (M: 208-506 mcmol/L; F: 149-369 mcmol/L)	851	92.2
High (M: >507 mcmol/L; F: >369 mcmol/L)	63	6.8
AST		
Low (M: <17 U/L; F: <14 U/L)	8	0.9
Normal (M: 17-59 U/L; F: 14-36 U/L)	883	95.6
High (M: >59 U/L;F: >36 U/L)	33	3.6
ALT		
Low (M: <21 U/L; F: <9 U/L)	168	18.2
Normal (M: 21-72 U/L; F: 9-52 U/L)	713	77.2
High (M: >72 U/L; F: >52 U/L)	43	4.7

Remarks:
mmol/L = millimoles per liter
mcmol/L = 10^{-6} mole per liter
U/L = units per liter

Table 3 Pain symptoms and management of the participants

Pain symptoms and management	Frequency (N)	%
Pain		
No	718	76.7
Yes	218	23.3
	Mean	SD
Number of painful spots (among those who had painful spots (n=218))	2.3	1.6
Top ten common painful spots*	**Frequency (N)**	**%**
spot 57 (center lower back)	65	34.6
spot 49 (right shoulder)	35	18.6
spot 47 (left shoulder)	30	16.0
spot 28 (left knee)	28	14.9
spot 26 (right knee)	27	14.4
spot 58 (right lower back)	20	10.6
spot 56 (left lower back)	18	9.6
spot 27 (both knees)	14	7.4
spot 12 (left chest)	14	7.4
spot 13 (right arm)	12	6.4
Top ten common spots that the workers feel the most painful	**Frequency (N)**	**%**
spot 57 (center lower back)	83	38.1
spot 49 (right shoulder)	37	17.0
spot 28 (left knee)	34	15.6
spot 26 (right knee)	33	15.1
spot 47 (left shoulder)	32	14.7
spot 56 (left lower back)	22	10.1
spot 58 (right lower back)	21	9.6
spot 27 (both knees)	16	7.3
spot 13 (right arm)	15	6.9
spot 12 (left chest)	15	6.9
	Mean	SD
Average pain rating (0-10)	3.06	2.00

Table 3 Pain symptoms and management of the participants

Top ten pain management	Frequency (N)	%
Ignore	91	41.7
Cream	49	22.5
Pain killers	47	21.6
Health product	18	8.3
Physical therapy	12	5.5
Acupoint massage	11	5.0
Acupuncture	11	5.0
Massage	10	4.6
Chinese medicine	8	3.7
Bone setting doctor	6	2.8
	Mean	SD
Pain relief percentage (0-100%)	34.70	34.42
Affect daily life (0-10)	2.41	2.61
Affect mood (0-10)	2.09	2.62
Affect walking ability (0-10)	2.02	2.71
Affect work (0-10)	2.05	2.68
Affect relationship (0-10)	0.54	1.62
Affect sleep (0-10)	2.35	2.77
Affect hobbies (0-10)	1.47	2.58

* please refer to Figure 1 for the painful locations

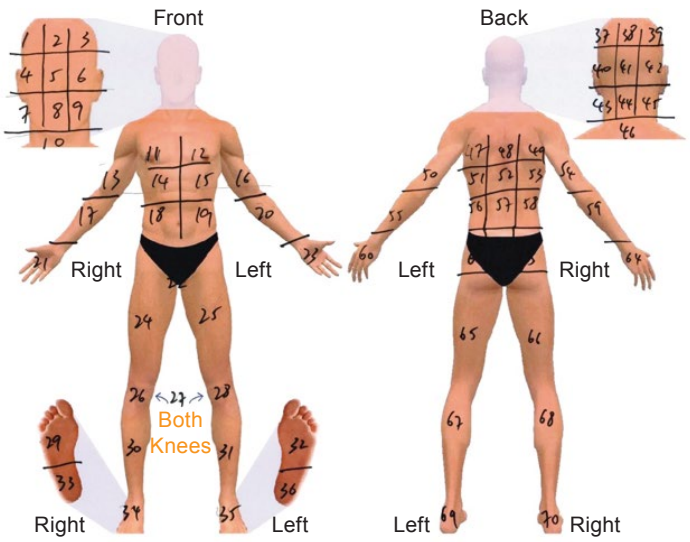

Figure 1 The possible painful locations

The blood chemistry in construction workers was comparable to the general population in Hong Kong; however, the prevalence of obesity may be higher than the general population (62.6% vs. 39.0%) (Table 2) (Department of Health & The University of Hong Kong, 2004; Centre for Health Protection, Department of Health, 2014a; Cheung, Ong, Tso, Lam, & Lam, 2011) possibly due to the limitation of BMI, which may be over-estimated in muscular individuals (Centers for Disease Control and Prevention, 2010).

The present study showed that hypertension, obesity and pain experience were prevalent in construction workers. Cardiovascular disease and musculoskeletal disorders were common reasons for permanent disability and hence, early retirement (Brenner & Ahern, 2000). Therefore, the present study provides a justification for future interventions to address and prevent hypertension, obesity, and pain experience in the construction industry.

3.3 Lifestyle Behaviors

The prevalence of consuming sufficient dairy products (2 serves or more), protein (3 serves or more), and fruit and vegetable (5 serves or more) were 2.0%, 69.9%, and 7.9%, respectively (Table 4). The corresponding figures for smoking and exceeding alcohol consumption were 41.2% and 5.7% respectively (Daily drinkers: 11.7%). A quarter of workers engaged in sufficient leisure-time exercise (150min moderate Physical Activities (PA) or 90min vigorous PA/week) (4 times or more a week: 12.0%). Warm-up and cool-down before and after work were not common for construction workers (50.1% and 14.5%, respectively).

Very few construction workers consumed sufficient amount of fruit and vegetables and dairy product which were less than the general population (Centre for Health Protection, Department of Health, 2013; Centre for Health Protection, Department of Health, 2014b). Smoking and alcohol consumption was common for construction workers and more frequent than the general population (Centre for Health Protection, Department of Health, 2014c; Centre for Health Protection, Department of Health, 2014d). Additionally, leisure-time physical activity, warm up and cool down before and after work were not common. Reduced substance use (tobacco use and alcohol consumption), fruit and vegetable intake, physical activity, normal weight status and blood pressure were commonly found to reduce the risk of cancers (http://www.wcrf.org/) and/or cardiovascular diseases (American Heart Association, 2013). Therefore, it is important to deliver and enhance health education to promote healthy lifestyles.

Table 4 Healthy behaviours of the participants

Lifestyle behaviours	Frequency (N)	%
Daily protein (meat and seafood) consumption sufficient ≥3 servings		
no	280	30.1
yes	650	69.9
Daily fruit and vegetable consumption sufficient ≥5 servings/day		
no	854	92.1
yes	73	7.9
Daily dairy consumption sufficient ≥2 servings/day		
no	914	98.0
yes	19	2.0
Weekly softdrink recommendation <36oz per week		
do not meet guideline	330	35.4
meet guideline	602	64.6
Daily alcohol consumption guideline (≤2 units/day for men & ≤1 units/day for women)		
do not meet guideline	53	5.7
meet guideline	877	94.3
Smoking status		
smoker	383	41.2
non smoker	547	58.8
Warm-up or stretching before working		
No	466	49.9
Yes	467	50.1
Cool-down or stretching before working		
No	795	85.2
Yes	138	14.8
Physical activity (Duration of leisure-time physical activity that the workers engaged in: 150min moderate PA or 90min vigorous PA/week) (N=502)		
do not meet recommendation	379	75.5
meet recommendation	123	24.5
	Mean	SD
Sleep (duration in hours) (N=929)		
	6.92	1.17

3.4 The Influences of Demographic Characteristics and Lifestyles on Physical Health

The socio-demographic differences in cardiovascular risk factors and pain symptoms were found. Younger and more educated workers had less cardiovascular problems (e.g., hypertension, high cholesterol, and high blood glucose) than the older and less educated ones (Table 5). In terms of renal and liver functions, only higher uric acid level was found in female than male workers (Table 6). Similarly, more pain symptoms were found in female, older, and less educated workers than the male, younger, and less educated ones (Table 7). Scaffolders, waterproofing workers, and welders reported the least pain whereas divers, rebar workers, riggers, and plumbing workers reported the most pain (Figure 2).

Table 5 Demographic characteristics of participants who had normal weight status, blood pressure, blood cholesterol and glucose levels and those who did not

Normal weight	No		Yes			Normal blood pressure (No)		Yes			Normal serum cholesterol level (No)		Yes			Normal blood glucose level (No)		Yes		
	N	%	N	%	p-value	N	%	N	%	p-value	N	%	N	%	p-value	N	%	N	%	p-value
Gender																				
Male	504	62.4	304	37.6	0.65	306	38.3	493	61.7	0.57	274	34.0	528	65.8	0.96	48	7.7	577	92.3	0.81
Female	80	64.5	44	35.5		50	41.0	72	59.0		42	34.4	80	65.6		7	8.4	76	91.6	
Age																				
20-29	81	57.4	60	42.6	0.11	37	26.4	103	73.6	<0.001	22	15.7	118	84.3	<0.001	1	0.9	108	99.1	<0.001
30-29	112	65.5	59	34.5		50	29.9	117	70.1		56	33.3	112	66.7		4	3.2	120	96.8	
40-49	151	68.9	68	31.1		73	34.0	142	66.0		77	35.6	139	64.4		9	5.4	158	94.6	
50-59	177	59.0	123	41.0		138	45.7	164	54.3		127	41.9	176	58.1		27	11.4	209	88.6	
60 or older	63	62.4	38	37.6		59	59.0	41	41.0		35	35.0	65	65.0		14	18.9	60	81.1	
Education level																				
No formal education/ primary education	170	68.5	78	31.5	0.079	114	46.2	133	53.8	0.007	91	36.7	157	63.3	<0.001	18	9.7	167	90.3	0.10
Junior secondary education	216	62.4	130	37.6		135	29.6	206	60.4		122	35.7	220	64.3		20	7.5	248	92.5	
Senior secondary education	139	59.9	93	40.1		78	33.9	152	66.1		89	38.5	142	61.5		15	8.9	153	91.1	
Post-secondary education- diploma, associate, degree	57	55.3	46	44.7		29	29.0	71	71.0		14	14.0	86	86.0		2	2.4	83	97.6	
Ethnicity / residential status																				
Chinese-born in HK or live in HK >7 years	525	62.9	309	37.1	0.18	323	39.3	499	60.7	0.23	293	35.5	532	64.5	0.045	52	5.3	595	92.0	0.56
Chinese-born in Mainland	49	57.0	37	43.0		27	31.0	60	69.0		21	24.1	66	75.9		3	5.9	48	94.1	
Minority	10	83.3	2	16.7		6	50.0	6	50.0		2	16.7	10	83.3		0	0.0	10	100.0	

Table 6 Demographic characteristics of participants who had normal liver and kidney functions and those who did not

Normal Urea level	No		Yes			Normal Uric Acid level (No)		Yes			Normal AST level (No)		Yes			ALT level (Low)		Normal		High		
	N	%	N	%	p-value	N	%	N	%	p-value	N	%	N	%	p-value	N	%	N	%	N	%	p-value
Gender																						
Male	33	4.1	769	95.9	0.22	54	6.7	747	93.3	0.002	29	3.6	773	96.4	0.002	166	20.7	597	74.4	39	4.9	<0.001
Female	8	6.6	114	93.4		18	14.8	104	85.2		12	9.8	110	90.2		2	1.6	116	95.1	4	3.3	
Age																						
20-29	5	3.6	135	96.4	0.12	6	4.3	134	94.7	0.033	1	0.7	139	99.3	0.010	42	30.0	92	65.7	6	4.3	<0.001
30-29	4	2.4	164	97.6		10	6.0	157	94.0		10	6.0	157	94.0		26	15.6	126	75.4	15	9.0	
40-49	8	3.7	208	96.3		16	7.5	198	92.5		5	2.3	210	97.7		39	18.1	165	76.7	11	5.1	
50-59	15	5.0	288	95.0		25	8.3	277	91.7		16	5.3	286	94.7		42	13.9	252	83.4	8	2.6	
60 or older	9	9.0	91	91.0		15	15.0	85	85.0		9	9.0	91	91.0		19	19.0	78	78.0	3	3.0	
Education level																						
No formal education/ primary education	14	5.6	234	94.4	0.40	21	8.5	227	91.5	0.23	16	6.5	232	93.5	0.24	34	13.7	203	81.9	11	4.4	0.31
Junior secondary education	17	5.0	325	95.0		31	9.1	311	90.9		15	4.4	327	95.6		64	18.7	263	76.9	15	4.4	
Senior secondary education	6	2.6	225	97.4		16	6.9	215	93.1		6	2.6	225	97.4		48	20.8	173	74.9	10	4.3	
Post-secondary education- diploma, associate, degree	4	4.0	96	96.0		3	3.0	96	97.0		4	4.0	96	96.0		22	22.0	71	71.0	7	7.0	
Ethnicity / residential status																						
Chinese-born in HK or live in HK >7 years	39	4.7	786	95.3	0.25	61	7.4	763	92.6	0.32	37	4.5	788	95.5	0.75	157	19.0	625	75.8	43	5.2	0.033
Chinese-born in Mainland	1	1.1	86	98.9		9	10.3	78	89.7		4	4.6	83	95.4		9	10.3	78	89.7	0	0.0	
Minority	1	8.3	11	91.7		2	16.7	10	83.3		0	0.0	12	100.0		2	16.7	10	83.3	0	0.0	

Table 7 Demographic characteristics among those who reported pain and who did not

	No pain		Pain		
	N	%	N	%	p-value
Gender					
Male	636	78.8	172	21.2	<0.001
Female	78	62.9	46	37.1	
Age					
20-29	122	87.1	18	12.9	0.028
30-29	133	77.3	39	22.7	
40-49	162	74.3	56	25.7	
50-59	225	73.8	80	26.2	
60 or older	76	75.2	25	24.8	
Education level					
No formal education/ primary education	185	74.0	65	26.0	0.016
Junior secondary education	254	73.0	94	27.0	
Senior secondary education	192	83.1	39	16.9	
Post-secondary education- diploma, associate, degree	84	81.6	19	18.4	
Ethnicity/residential status					
Chinese-born in HK or live in HK >7 years	637	76.2	199	24.8	0.377
Chinese-born in Mainland	69	79.3	18	20.7	
Minority	11	91.7	1	8.3	
Warm-up or stretching before working					
No	339	72.9	126	27.1	0.004
Yes	378	80.9	89	19.1	
Cool-down or stretching before working					
No	619	78.0	175	22.0	0.074
Yes	98	71.0	40	29.0	
Physical activity (Duration of leisure-time physical activity that the workers engaged in: 150min moderate PA or 90min vigorous PA/week)					
Do not meet guideline	294	77.6	85	22.4	0.007
Meet guideline	109	88.6	14	11.4	

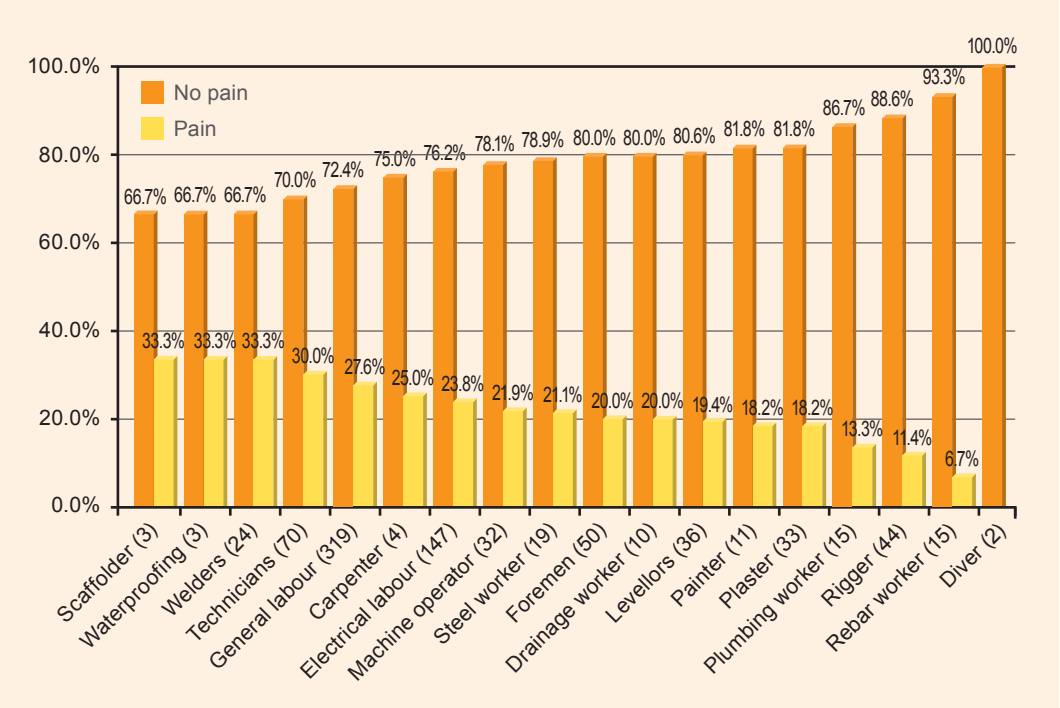

Figure 2 Job classification among those who had pain and who did not

Only few associations between lifestyles and the measured health indicators were found in the present study. For example, excessive alcohol consumption was associated with obesity (including both overweight and obese) and hypertension (88.8% vs. 61.8%; p=0.014 and 50.0% vs. 37.8%; p=0.055, respectively). On the other hand, longer duration of sleep was associated with normal weight status (spearman's coefficient: 0.084; p=0.011). Workers who warmed up before work or engaged in sufficient amount of leisure-time physical activity were less likely to report pain experience (19.1% vs. 27.1%; p=0.004; 11.4% vs. 22.4%; p=0.007, respectively).

Overall, older, female and less educated workers were more susceptible to cardiovascular risk factors and pain experience. Despite little associations between lifestyle and health condition in the present study, substantial evidence supports that healthy lifestyles (e.g. non-smokers, alcohol absenteeism, fruit and vegetable intake, physical activity, normal weight status and blood pressure) could reduce the risk of cancers (http://www.wcrf.org/) and/or cardiovascular diseases (American Heart Association, 2013). In addition, leisure-time physical activity may strengthen the muscles and hence, prevent injuries. Similar to warm-up before exercise, warm-up before work appears helpful to prevent injuries and pain experience. It is important to promote healthy lifestyle and design tailor-made interventions for construction workers, particularly for female, older, and less educated workers who were more vulnerable to cardiovascular problems and injuries.

4 RECOMMENDATIONS

4.1 Practical Recommendations

The findings suggest that relevant industry stakeholders may consider the following actions to improve workers' physical health:

1) To provide health education and interventions to increase the knowledge on and to facilitate healthy lifestyle behaviours (e.g. reduced alcohol consumption, smoking cessation, increased intake of fruit and vegetables, increased health-enhancing physical activity and warm-up before work) and to reduce cardiovascular problems (e.g. obesity and hypertension);

2) To provide health education and services to promote proper pain management since 40% of workers who experienced pain simply ignored it;

3) To design and deliver interventions specific for older and female workers who are more susceptible to cardiovascular problem and pain experience.

4.2 Research Recommendations

1) The pilot study reported that some lifestyle behaviours may affect the cardiovascular health and exercise may prevent or relieve the pain symptoms. Further research studies should be conducted to investigate and ascertain the associations between lifestyle behaviours and cardiovascular health and pain symptoms.

2) Few associations between lifestyle behaviours and heart health were found in the pilot study despite that extensive evidence supports the effects of lifestyle behaviours on heart health (American Heart Association, 2013). This may be explained by the possibly due to the gradual development and progress of non-communicable disease. Therefore, it is important to evaluate their effects longitudinally.

4.3 Way Forward

1) The project demonstrates the feasibility of establishing a systematic health database for health profiling in the construction industry. Future studies should be conducted to establish a longitudinal health profiling of construction workers with more in-depth health assessment at a large scale, industry-wide level;

2) Future studies should also expand the study from general physical health to a more comprehensive health profiling, covering blood chemistry and lifestyle behaviours (physical health) and psychological health;

3) Future studies should also consider developing, implementing, and evaluating interventions to address the health problems identified in the pilot study.

5 REFERENCES

American Heart Association (2013). *Heart Disease and Stroke Statistics-2013 Update: A Report from the American Heart Association.* Retrieved from https://www.cdph.ca.gov/services/DPOPP/regs/Documents/DRU%202%20-%20AHA%20-%20HDSS%202013.pdf

Brenner, H., & Ahern, W. (2000). Sickness absence and early retirement on health grounds in the construction industry in Ireland. *Occupational & Environmental Medicine,* 57, 615-620.

Center for Disease Control and Prevention. (2010). Body Mass Index: Considerations for Practitioners. Retrieved from http://www.cdc.gov/obesity/downloads/bmiforpactitioners.pdf

Centre for Health Protection, Department of Health. (2013). Consumption of Dairy Products. Retrieved from http://www.chp.gov.hk/en/data/1/10/280/2235.html

Centre for Health Protection, Department of Health. (2014a). Body Mass Index (BMI) distribution. Retrieved from http://www.chp.gov.hk/en/data/1/10/280/3994.html

Centre for Health Protection, Department of Health. (2014b). Consumption of Five Servings of Fruit and Vegetables per Day. Retrieved from http://www.chp.gov.hk/en/data/1/10/280/4012.html

Centre for Health Protection, Department of Health. (2014c). Alcohol Consumption. Retrieved from http://www.chp.gov.hk/en/data/1/10/280/4026.html

Centre for Health Protection, Department of Health. (2014d). Cigarette Smoking. Retrieved from http://www.chp.gov.hk/en/data/1/10/280/4015.html

Cheung, B.M.Y., Ong, K.L., Tso, A.W.K., Lam, T.H., & Lam, K.S.L. (2011). Increasing prevalence of hypertension in Hong Kong Cardiovascular Risk Factor Prevalence Study: role of general and central obesity. *Hong Kong Medical Journal,* 17 (Suppl. 1), 14.

Department of Health and University of Hong Kong. (2004). Report on Population Health Survey 2003/2004. http://www.chp.gov.hk/files/pdf/report_on_population_health_survey_2003_2004_en.pdf

Hong Kong Reference Framework for Diabetes Care for Adults in Primary Care Setting. http://www.pco.gov.hk/english/resource/professionals_diabetes_pdf.html

Ng, J.Y.K., & Chan, A. H. S. (2015). The Ageing Construction Workforce in Hong Kong: A Review. Paper presented at the International MultiCeonference of Engineers and Computer Scientists. Hong Kong.

Schuring, M., Burdorf, L., Kunst, A. and Mackenbach, J. (2007). The effects of ill health on entering and maintaining paid employment: Evidence in European countries. *Journal of Epidemiology & Community Health,* 61(7), 597-605.

World Cancer Research Fund. http://www.wcrf.org/

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2018

CIC Research Report No. CICRS_012