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Lei Hum Wee¹, Lena Lay Ling Yeap², Caryn Mei Hsien Chan^{1*}, Jyh Eiin Wong¹, Nor Aini Jamil¹,
Yogarabindranath Swarna Nantha³ and Ching Sin Siau⁴

Background: Organization productivity is strongly linked to employees' socioeconomic characteristics and health which is marked by absenteeism and presenteeism. This study aims to identify antecedent factors predicting employees' absenteeism and presenteeism by income, physical and mental health.

Methods: An online health survey was conducted between May to July 2017 among employees from 47 private companies located in urban Malaysia. A total of 5235 respondents completed the 20-min online employee health survey on a voluntary basis. Chi-Square or Fisher's exact tests were used to determine association between income with demographic and categorical factors of absenteeism and presenteeism. Multivariate linear regression was used to identify factors predicting absenteeism and presenteeism.

Results: More than one third of respondents' monthly income were less than RM4,000 (35.4%), 29.6% between RM4,000-RM7,999 and 35.0% earned RM8,000 and above. The mean age was 33.8 years (sd ± 8.8) and 49.1% were married. A majority were degree holders (74.4%) and 43.6% were very concerned about their financial status. Mean years of working was 6.2 years (sd ± 6.9) with 68.9% satisfied with their job. More than half reported good general physical health (54.5%) ($p = 0.065$) and mental health (53.5%) ($p = 0.019$). The mean hours of sleep were 6.4 h (sd ± 1.1) with 63.2% reporting being unwell due to stress for the past 12 months. Mean work time missed due to ill-health (absenteeism) was 3.1% (sd ± 9.1), 2.8% (sd ± 9.1) and 1.8% (sd ± 6.5) among employees whose monthly income was less than RM4,000, RM4,000-RM7,999 and over RM8,000 respectively ($p = 0.0066$). Mean impairment while working due to ill-health (presenteeism) was 28.2% (sd ± 25.3), 24.9% (sd ± 25.5) and 20.3% (sd ± 22.9) among employees whose monthly income was less than RM4,000, RM4,000-RM7,999 and over RM8,000 respectively ($p < 0.0001$). Factors that predict both absenteeism and presenteeism were income, general physical health, sleep length and being unwell due to stress.

Conclusions: A combination of socioeconomic, physical and mental health factors predicted absenteeism and presenteeism with different strengths. Having insufficient income may lead to second jobs or working more hours which may affect their sleep, subjecting them to stressful condition and poor physical health. These findings demand holistic interventions from organizations and the government.

Keywords: Absenteeism, Presenteeism, Employees, Lower income, Malaysia

* Correspondence:



There is an increasing recognition in developing nations that health and socioeconomic factors are critical in influencing workplace productivity [1]. Suboptimal prod-

between 18th of May to 18th of July 2017. The majority of the participating companies are from sectors such as Financial, IT and Computer Software, Healthcare, Hospitality, Advertising, Manufacturing, Food, Consultancy, Property and Telecommunications.

Email invitations were sent to the employer (one representative from Human Resource Department from each organization) and all eligible employees of interested organization to participate in the survey. The employer was given an indication of the minimum sample size

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Employee characteristics by income group (N = 5235)

Employee Characteristics	< RM4000	RM4000 - RM7999	>RM8000	Overall
Age, years	1856 (35.4%)	1548 (29.6%)	1831 (35.0%)	5235 (100%)
Mean (SD)	27.9 (6.0)	34.7 (7.6)	39.0 (8.5)	33.8 (8.8)
Median (IQR)	26 (6)	33 (10)	38 (12)	32 (12)***
(Min, Max)	(18, 59)	(21, 85)	(19, 67)	(18, 85)
Age years, No. (%)				
Age 18 to 24	609 (32.8)	41 (2.6)	54 (.03)	704 (13.5)***
Age 25 to 34	1004 (54.1)	840 (54.3)	545 (29.8)	2389 (45.6)
Age 35 to 44	197 (10.6)	496 (32.0)	770 (42.0)	1463 (28.0)
Age 45 to 54	43 (2.3)	136 (8.8)	367 (20.0)	546 (10.4)
Age 55 to 64	3 (0.2)	33 (2.1)	93 (5.1)	129 (2.5)
Age 65 above	0 (0.0)	2 (0.1)	2 (0.1)	4 (0.0)
Gender, No. (%)				
Male	592 (31.9)	572 (37.0)	812 (44.4)	1976 (37.8) ***
Female	1264 (68.1)	976 (63.0)	1019 (56.7)	3259 (62.3)
Ethnicity, No. (%)				
Malay	896 (48.3)	530 (34.2)	409 (22.3)	1835 (35.1) ***
Chinese	551 (29.7)	733 (47.4)	1066 (58.2)	2350 (44.9)
Indian	341 (18.4)	249 (16.1)	300 (16.4)	890 (17.0)
Others	68 (3.7)	36 (2.3)	56 (3.1)	160 (3.1)
Marital Status, No. (%)				
Single	1237 (66.7)	631 (40.8)	504 (27.5)	2372 (45.3) ***
Married	557 (30.0)	838 (54.1)	1177 (64.3)	2572 (49.1)
Separated/Divorced/Widowed	29 (1.6)	50 (3.2)	53 (2.9)	132 (2.5)
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less than RM4,000 (35.4%), 29.6% between RM4,000-
RM7,999 and 35.0% earned RM8,000 and above. Among
those with monthly income less than RM4000, the mean
age was 27.9 years (sd \pm 6.0); a majority were single

separated ($p = 0.006$), kidney disease ($p < 0.001$), diabetes ($p = 0.038$) and migraine ($p = 0.001$) predicted higher absenteeism, while employees with higher education ($p = 0.002$) reported lower absenteeism. Both lower job satisfaction ($p < 0.001$) and good ($p = 0.002$), fair ($p < 0.001$), poor ($p < 0.001$) and very poor mental health ($p = 0.001$), as compared to very good mental health, were predictors of presenteeism respectively. (refer Table 3).

This study provides evidence on the importance of employees' socioeconomic and health status as determinants of work productivity. In this sample, those from the lower income group were generally younger, single, female, less experienced, reported higher stress levels and financial concerns, lower job satisfaction, poor men-

($sd \pm 25.5$) and 20.3 ($sd \pm 22.9$) among employees who earned less than RM4,000, RM4,000-RM7,999 and over RM8,000 in a month respectively ($p < 0.0001$). (Refer Table 2).

Factors that predicted both absenteeism and presenteeism were income, general physical health, sleep length and being unwell due to stress. The absenteeism percentage decreased 0.53 ($p = 0.067$) and 1.46 ($p < 0.001$) if those earned between RM4000–RM7999 and RM8,000 and above increased by 1 respectively. The presenteeism percentage decreased 0.80 ($p = 0.337$) and 3.10 ($p < 0.001$) if those earned between RM4000–RM7999 and RM8,000 and above increase by 1 respectively. In terms of income, lower income employees recorded higher percentages of absenteeism and presenteeism. The absenteeism percentage for physical health increased 0.97 ($p = 0.007$), 1.44 ($p < 0.001$), 2.21 ($p = 0.002$) and 9.00 ($p < 0.001$) for 1 unit of increase in good, fair, poor and very poor physical health respectively. Meanwhile, the presenteeism percentage increased 3.87 ($p = 0.001$), 8.17 ($p < 0.001$), 16.59 ($p < 0.001$) and 25.73 ($p < 0.001$) for 1 unit of increase in good, fair, poor and very poor physical health respectively. The absenteeism percentage increased 0.32 and the presenteeism percentage decreased 0.91 ($p = 0.002$) with an hour increased in the sleep length respectively. The absenteeism percentage decreased 1.53 ($p < 0.001$) and 1.67 ($p < 0.001$) for 1 unit of increase some extent of and not being unwell due to stress at work respectively. The presenteeism percentage decreased 6.82 ($p < 0.001$) and 14.06 ($p < 0.001$) for 1 unit of increase some extent of and not being unwell due to stress at work respectively. Having insufficient income may be leading to second jobs or working more hours which may affect their sleep, subjecting them to stressful condition and poor physical health. Being divorced/

Factors predicting absenteeism and presenteeism among employees in Malaysia (N = 5235)

	Absenteeism			Presenteeism		
	Coef.	[95% Confidence Interval]	P-value	Coef.	[95% Confidence Interval]	P-value
Income						
< RM4000 ^c	1.00	–	–	1.00	–	–
RM4000 - RM7999	–0.53	(–1.10, 0.04)	0.067	–0.80	(–2.42, 0.83)	0.337
> RM8000	–1.46	(–2.03, –0.88)	< 0.001	–3.10	(–4.83, –1.38)	< 0.001
Age, years ^b	–	–	–	–0.31	(–0.39, –0.22)	< 0.001
Marital Status^a						
Single ^c	1.00	–	–	–	–	–
Married	0.70	(0.20, 1.20)	0.006	–	–	–
Separated/Divorced/Widowed	2.05	(0.58, 3.52)	0.006	–	–	–
Prefer not to say	–0.78	(–2.12, 0.57)	0.258	–	–	–
Education^a						
Less than University ^c	1.00	–	–	–	–	–
University degree or higher	–0.84	(–1.37, –0.31)	0.002	–	–	–
Job Satisfaction^b						
Agree ^c	–	–	–	1.00	–	–
Neither agree nor disagree	–	–	–	1.50	(–0.26, 3.25)	0.094
Disagree	–	–	–	4.63	(2.75, 6.50)	< 0.001
Physical Health						
Very good ^c	1.00	–	–	1.00	–	–
Good	0.97	(0.26, 1.68)	0.007	3.87	(1.60, 6.14)	0.001
Fair	1.44	(0.67, 2.22)	< 0.001	8.17	(5.60, 10.74)	< 0.001
Poor	2.21	(0.78, 3.64)	0.002	16.59	(12.29, 20.88)	< 0.001
Very poor	9.00	(4.77, 13.23)	< 0.001	25.73	(13.80, 37.66)	< 0.001
Mental Health^b						
Very good ^c	–	–	–	1.00	–	–
Good	–	–	–	2.98	(1.05, 4.91)	0.002
Fair	–	–	–	6.24	(3.84, 8.63)	< 0.001
Poor	–	–	–	12.43	(8.43, 16.42)	< 0.001
Very poor	–	–	–	17.03	(9.01, 25.05)	< 0.001
Sleep Length	0.32	(0.11, 0.52)	0.002	–0.91	(–1.48, –0.35)	0.002
Kidney Diseases^a						
No ^c	1.00	–	–	–	–	–
Yes	7.28	(4.22, 10.34)	< 0.001	–	–	–
Diabetes^a						
No ^c	1.00	–	–	–	–	–
Yes	0.91	(–1.69, 0.09, 3.29)	0.038	4.1267.28	(4.22, 4.1267.28)	0.004

absenteeism and presenteeism, as the interaction between individual and organizational problems need to be taken into consideration [\[21, 70\]](#),

Limitations and strengths

This study has a few limitations. Due to the cross-sectional design of this study, it is not possible to make causal inferences on the reported factors associated with absenteeism and presenteeism. Presenteeism could be best measured with a longitudinal study design using electronic daily diaries to capture prospective data [96]. This study employs single-item questions to measure absenteeism and presenteeism. In addition, data on employees' physical

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