ORIGINAL ARTICLE

THE EFFECT OF WORKING ENVIRONMENT CONDITIONS ON SPECIALIST PHYSICIANS' PERFORMANCE AT MEDAN TEACHING HOSPITAL

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ABSTRACT

The condition of work environment (patient room) is often out of concern to the management so that they do not meet the requirements of Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004 concerning Hospital Environmental Health Requirements. It will have implications for the performance of the doctor (specialist). This study aimed to describe the conditions of the work environment (temperature, lighting, and dust) and the doctor's performance and the relationship between the work environment and the doctor's performance. This research was a quantitative study with a cross sectional design. The research was conducted in 3 teaching hospitals in Medan, namely H. Adam Malik Hospital, dr. Pirngadi and RSU USU during April - November 2018. The study population was 236 people with a sample of 22 people taken using incidental sampling technique. The data obtained by measuring the conditions of the work environment (temperature, lighting, and dust) and interviews using a questionnaire to measure the performance of doctors. Data analysis used Fisher's Exact Test. The results showed that there was no influence of work environment conditions on the doctor's performance, however the temperature and lighting conditions did not meet the requirements. Meanwhile, the temperature of the work room affected the behavior of doctors. Thus, the hospital management needs to take corrective action on working environment conditions by replacing old air conditioners or regularly maintaining air conditioners, setting up a barrier against noise sources, and replacing the bulb with a lighter intensity. The medical committee needs to regularly supervise the work of doctors so that their performance is achieved according to the target.

***Keywords**: effect of working environment, specialist physicians' performance*

INTRODUCTION

In hospitals, specialist physicians are one of the important components to be required. The human resources need of medical personnel are determined by the type of hospital[1]. Hospitals must be equipped with equipment and working facilities. One of the working facilities that needs special attention is the patient observation ward.

Observations wards should be safe and comfortable and provide a good working environment conditions. A study reported that it is important to recognize that physical factors such as inappropriate temperature, noise, inadequate lighting and dust can cause discomfort and even affect health and hence may decrease the performance of health workers, especially specialist physicians[2]. In addition, physical hazards can make patients who are waiting for appointments or procedures uncomfortable. A previous study reported that poor working conditions (physical exertion, uncomfortable environment, and occupational hazards) decreased employee performance[3].

Teaching hospitals must have specialist physicians in key disciplines, including pediatrics, internal medicine, gynecology and surgery. In order to work effectively, these specialist physicians need a comfortable working environment conditions that complies with Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004 concerning Environmental Health Requirements in Hospitals. However, hospital management teams often neglect the working environment conditions of medical staff which can affect the performance of conditions of the work environment are often ignored by hospital management so that it can have an effect on specialist physicians' performance, i.e. resulting in inaccurate observations and disruption of concentration, leading ultimately to a decrease in performance. Doctors' performance can be measured in terms of work quantity, work quality and conduct of patient observations. The aim of this study was to describe the working environment conditions (temperature, noise, lighting and dust) and performance of specialist physicians and determine the relationship between them.

METHODS

Research design

This was a quantitative, cross sectional study and was conducted in 3 teaching hospitals in Medan, namely H. Adam Malik hospital, Dr. Pirngadi hospital and USU hospital, between April and November 2018. Population appropriate to the research was 236 persons at the Medan teaching

hospitals comprising 78 pediatricians, 64 internists, 71 obstetrician-gynecologists and 23 surgeons. The sample size was calculated using the Slovin formula:

$$n = \frac{N}{N.d^2+1}$$

N = 236 / (236 × 0.142 + 1) = 236 / 5.6256 = 41.95 ≈ 42 people. Each specialism was sampled proportionally, as follows:
Internists = (64/236) x 41.95 = 11.376 ≈ 11 people
Pediatricians=(78/236)x41.95= 13.864 ≈ 14 people
Surgeons = (23/236) x 41.95 = 4.088 ≈ 4 people
Obstetrician-gynecologists = (71/236) x 41.95 = 12.620≈13people

From the total sample, sample was collected using *incidental sampling technique*, only 22 people were able and willingly to be a sample.

The working environment conditions considered in this study consisted of 22 rooms with an area of approximately 12-15 m^2 each. The working environment conditions (temperature, noise intensity, light intensity and dust concentration) were measured three times by Medan OSH Center technicians, at 8:00 a.m., 12:00 p.m. and 16:00 p.m. representing 8 working hours: the beginning of a work shift, in the middle of a work, and the end of the work, respectively, according to Indonesian National Standard (SNI) 16-7061-2004. Measurements were made using a heat stress area monitor, sound level meter, lux meter and personal dust sampler.

The tool used to measure temperature was the heat stress area of the monitor which measures dry temperature, natural and bulb wet temperature, radiation temperature and humidity in an integrated manner. The determination of the temperature measurement point in the area is qualitative, indicating a possible source of heat or heat exposure. Heat pressure (temperature) is expressed by the Wet Bulb Globe Temperature (WBGT) Index parameter. The instrument used to measure noise was a sound level meter. This tool has Leq A completeness with a certain time span at weighted time. The sound pressure touches the microphone membrane on the instrument, the sound signal is converted into an electrical signal passed to the weighting network, the signal amplified by the amplifier is forwarded on the screen so that the measured sound intensity level can be read. To get the mean noise intensity, the measurement results were added up for each measurement time and divided by 3.

The instrument used to measure the lighting intensity was a lux meter which using a digital format. This tool consists of a frame, a sensor with photo cells, and a screen panel. The sensor is placed on a light source where the intensity will be measured. Light will shine on the photo cells as energy to be converted into an electric current. The more light absorbed by the cell, the higher the current produces. The results of the lighting intensity measurement are displayed on the panel screen in lux units. To get the average lighting intensity, the measurement results were added up for each measurement time and divided by 3.

The instrument used to measure the dust concentration was a personal dust sampler. The device was attached to the labor waist and the respirable sampler holder which contains the filter was attached to the collar of the work clothes (breathing zone) and then the respiratory dust concentration was determined gravimetrically. The more dust stuck to the filter the higher the dust concentration. To get the average dust concentration, the measurement results were added up each measurement time and divided by 3.

The averages of the three measurements were used in analyses. The averages were classified according to whether they met the standard set in the Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004 concerning Hospital Environmental Health Requirements. These standards are as follows: room temperature should be 21-24 °C, noise intensity ≤ 45 dB (A), lighting intensity ≥ 300 lux and dust concentration ≤ 0.150 mg/m3. Working environment conditions (temperature, noise intensity, light intensity, and dust concentration) categorized as non-standardized and standardized based on the Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004. At the end of their shift, specialist physicians' performance was measured using a 14-item interviewer-administered questionnaire consisting of 5 statements about work quantity, 3 statements about work quality and 6 statements about behavior. Statements were scored 1 if the respondent had completed the task or procedure described and 0 if he or she had not, thus scores could range from 0 to 14. Scores ≥ 12 were considered to represent good performance.

Statistical analysis
The working environment conditions (temperature, noise intensity, lighting intensity and dust concentration) and performance variables (work quantity, work quality, and behavior) were measured using a nominal scale. The effects of working environment conditions on performance were analyzed using Fisher's exact test in SPSS version 20.

RESULTS

Working environment conditions

Table 1 shows the average measurements of the working environment conditions (temperature, noise, lighting, and dust) in the workplaces of specialist physicians at Medan teaching hospital.

The grand averages for temperature, noise, lighting, and dust concentration were as follows: 25.25°C, 64.73 dB (A), 219 lux and 0.127 mg/m^3, respectively. Temperature, noise level and lighting did not meet the standards set by the Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004, but the dust concentration was acceptable.

If the working environment conditions fails to meet the legal standard over long periods of time this will have a deleterious effect on the health of the specialist physicians, in the form of physical discomfort during work, impaired hearing, loss of concentration and impaired vision. These effects will reduce physicians' performance (quantity, quality and behavior) of key professional tasks, which will, of course, have a negative effect on patient care. For example, if specialist physicians' rush through a health check because their working environment conditions is uncomfortable they may not be being working in accordance with standard operating procedures (SOPs).

Specialist physicians' performance

Figure 1 shows the frequency distribution of the performance of specialist physicians at Medan education hospital.

Specialist physicians' performance was categorized as good if they scored ≥12 (out of 14) on the questionnaire about work quantity, work quality and working behavior and poor if they scored <12. The majority of the sample (n = 15, 68.20%) was classed as showing good performance and the rest of the sample (n=7, 31.80%) was classed as showing poor performance.

Quantity of specialist physicians' work

Figure 2 shows the frequency distribution for quantity of work done by specialist physicians at Medan teaching hospital.

Work quantity was classed as good for specialist physicians who scored ≥4 (out of 5) on the statements about quantity of work and poor otherwise. Work quantity was classed as good for majority of the sample (n = 14, 62.60%) and poor for 8 people (36.40%).

Figure 3 shows the frequency distribution of the quality of work of specialist physicians at Medan teaching hospital.

Work quality was categorized as good for specialist physicians who scored ≥ 2 (out of 3) for the statements on quality of work and poor otherwise. Quality of work was classed as good for the majority of the sample (n = 17, 77.30%) and poor for 5 of the specialist physicians' (22.70%).

Specialist physicians' behaviour

Figure 4 shows a frequency distribution of behaviour of specialist physicians in Medan teaching hospital. The behaviour of specialist physicians was categorized as good if they scored ≥5 (out of 6) on the items about behaviour whilst providing healthcare services and poor otherwise. The behaviour of the majority of the sample (n = 13, 59.10%) was classed as good; the behaviour of 9 specialist physicians' (40.90%) was classed as poor.

The effect of working environment conditions on the performance, quantity and quality of work and behaviour of specialist physicians

Table 2 shows the effect of working environment conditions on performance, work quantity, work quality and specialist physicians' behaviour at Medan teaching hospital.

Fisher's exact tests showed that working environment conditions did not affect doctors' performance (p = 0.648), work quantity (p = 0.380), work quality (p = 0.360) or behavior (p = 0.203). Ilyas reported that the performance of a specialist physicians' is influenced more by factors such as wanting to get professional recognition and a reputation for providing good care to patients than by working environment conditions[1].

The effect of temperature on the performance, quantity, and quality of work and behaviour of specialist physicians

Table 3 shows the effect of temperature on the performance, work quantity, work quality and behaviour of specialist physicians at Medan teaching hospital.

Fisher's exact tests showed that temperature did not affect performance (p = 0.054), work quantity (p = 0.054), and work quality (p = 1.00). This is because doctors must be able to work effectively in an environment where the average temperature was 25.25°C, which is slightly higher than the Regulation of Minister of Health of the Republic of Indonesia (Permenkes) No. 1204 of 2004. This result is not similar with research by Utari and Wahyuati, who found that doctors need a comfortable, quiet, and safe working atmosphere to perform well[4]. We did, however, find that room temperature had an effect on the behavior of doctors (p = 0.001.

The effect of noise on the performance, quantity, and quality of work and behaviour of specialist physicians

Table 4 shows the effects of noise on the performance, work quantity, work quality and behaviour of specialist physicians at Medan teaching hospital.

Fisher's exact test showed that the influence of noise on performance, work quantity, work quality and the behaviour of specialist physicians' could not be tested because there were no observations in which noise conditions conformed to the standard. Generally noise in the specialist physicians' room comes from conversations between patients and the sound of passing vehicles. Measurements of noise intensity throughout the room exceeded the threshold value, but did not interfere with the performance, work quantity, work quality and behaviour of the specialist physicians'.

The effects of lighting intensity on the performance, quantity and quality of work and behavior of specialist physicians

Table 5 shows the results of the analysis of the effect of lighting intensity on performance, work quantity, work quality and behaviour of specialist physicians at the Medan teaching hospital.

Fisher's exact test showed that the intensity of work room lighting did not affect specialist physicians' performance (p = 0.350), work quantity (p = 1.00), work quality (p = 1.00) or behaviour (p = 0.165). The performance (work quantity, work quality and behaviour) of a specialist physician is not determined by the conditions of the intensity of work room lighting. This is because the specialist physicians has to complete his or her tasks (e.g. health checks) regardless of whether the lighting complies with the standard set or not. This finding is not in line with Nduku et al. research, which found that as many as 71 of 146 respondents (49%) worked under inadequate lighting, which reduced their performance[5].

The effect of dust concentration on the performance, work quantity, work quality and work behaviour of specialist physicians

Table 6 shows the effect of dust concentration on the performance, work quantity, work quality and work behaviour of specialist physicians at Medan teaching hospital.

Fisher's exact test showed that there was no effect of dust concentration in the work room on doctors' performance (p = 0.616), work quantity (p = 0.351), work quality (p = 1,000) or behaviour (p = 0.333)

Table 1: Average temperature, noise, lighting, and dust measurements from the working rooms of specialist physicians at Medan teaching hospitals.

Working room	Temperature	Noise intensity	Light intensity	Dust concentration
1	22.9	63.5	203	0.102
2	22.9	63.5	203	0.102
3	25.2	64.4	183	0.057
4	25.2	64.4	183	0.057
5	25.2	64.4	183	0.057
6	23.5	60.1	184	0.074
7	23.1	61.2	153	0.105
8	23.1	61.2	153	0.105
9	23.1	61.2	153	0.105
10	26.5	61.2	323	0.087
11	26.5	61.2	323	0.087
12	29.4	62.4	272	0.222
13	29.4	62.4	272	0.222
14	29.0	70.2	316	0.136
15	29.0	70.2	316	0.136
16	29.0	70.2	316	0.136
17	29.0	70.2	316	0.136
18	29.0	70.2	316	0.136
19	28.2	65.5	113	0.188
20	28.2	65.5	113	0.188
21	28.2	65.5	113	0.188
22	28.2	65.5	113	0.188
Average	**25.25**	**64.73**	**219**	**0.127**
Standardized	6(27.30%)	0(0.00%)	7(31.80%)	16(72.70%)
Non-standardized	16(72.70%)	22(100.00)	15(68.20%)	6(27.30%)

Table 2: The effect of working environment conditions on performance, work quantity, work quality and specialist physicians behavior at Medan teaching hospital.

Working environment conditions	Performance				Total (%)	P-value
	Poor		Good			
	Total	%	Total	%		
Poor	2	9.10	7	31.80	9 (40.90)	0.648
Good	5	22.70	8	36.40	13 (59.10)	
	Work quantity					
	Poor		Good			
	Total	%	Total	%		
Poor	2	9.09	6	27.27	9 (36.36)	0.380
Good	7	31.82	7	31.82	13 (63.64)	
	Work quality					
	Poor		Good			
	Total	%	Total	%		
Poor	1	4.55	8	36.36	9 (40.91)	0.360
Good	4	18.18	9	40.91	13 (59.09)	
	Behavior					
	Poor		Good			
	Total	%	Total	%		
Poor	2	9.09	7	31.82	9 (40.91)	0.203
Good	7	31.82	6	27.27	13 (59.09)	

Table 3: The effect of temperature on the performance, work quantity, work quality and behavior of specialist physicians at Medan teaching hospital.

Temperature	Performance				Total (%)	P-value
	Poor		Good			
	Total	%	Total	%		
Non standardized	3	13.64	13	59.09	16 (72.73)	0.054
Standardized	4	18.18	2	9.09	6 (27.37)	
	Work quality					
	Poor		Good			
	Total	%	Total	%		
Non standardized	4	18.18	12	54.55	16 (72.73)	0.137
Standardized	4	18.18	2	9.09	6 (27. 27)	
	Work quality					
	Poor		Good			
	Total	%	Total	%		
Non standardized	2	9.09	14	63.63	16 (72.72)	0.100
Standardized	3	13.64	3	13.64	6 (27.28)	
	Behavior					
	Poor		Good			
	Total	%	Total	%		
Non standardized	3	13.64	13	59.09	16 (72.73)	0.001
Standardized	6	27.27	0	0.00	6 (27.27)	

Table 4: The effects of noise on the performance, work quantity, work quality and behavior of specialist physicians at Medan teaching hospital

Noise	Performance				Total (%)	*p*-value
	Poor		Good			
	Total	%	Total	%		
Non standardized	7	31.80	15	68.20	22 (100.00)	uncountable
Standardized	-	-	-	-	-	
	Work quantity					
	Poor		Good			
	Total	%	Total	%		
Non standardized	8	36.36	14	63.64	22 (100.00)	uncountable
Standardized	-	-	-	-	-	
	Work quality					
	Poor		Good			
	Total	%	Total	%		
Non standardized	9	40.91	13	59.09	22 (100.00)	uncountable
Standardized	-	-	-	-	-	
	Work behavior					
	Poor		Good			
	Total	%	Total	%		
Non standardized	5	22.73	17	77.27	22 (100.00)	uncountable
Standardized	-	-	-	-	-	

Table 5. The effect of lighting intensity on performance, work quantity, work quality and the behavior of specialist physicians at Medan teaching hospital

Lighting intensity	Performance				Total (%)	P-value
	Poor		Good			
	Total	%	Total	%		
Non standardized	6	27.27	9	40.91	15 (68.18)	0.350
Standardized	1	4.55	6	27.27	7 (31.82)	
	Work quantity					
	Poor		Good			
	Total	%	Total	%		
Non standardized	6	27.27	9	40.91	15 (68.18)	1.000
Standardized	2	9.09	5	22.73	7 (31.82)	
	Work quality					
	Poor		Good			
	Total	%	Total	%		
Non standardized	4	18.18	11	50.00	15 (68.18)	1.000
Standardized	1	4.55	6	27.27	7 (31.92)	
	Behavior					
	Poor		Good			
	Total	%	Total	%		
Non standardized	8	36.36	7	31.82	15 (68.18)	0.165
Standardized	1	4.55	6	27.27	7 (31.82)	

Table 6. The effect of lighting intensity on performance, work quantity, work quality and the behavior of specialist physicians at Medan teaching hospital.

Dust concentration	Performance				Total (%)	*p*-value
	Poor		Good			
	Total	%	Total	%		
Non standardized	1	4.55	5	22.73	6 (27.28)	0.616
Standardized	6	27.27	10	45.45	16 (72.72)	
	Work quantity					
	Poor		**Good**			
	Total	%	Total	%		
Non standardized	1	4.55	5	22.73	6 (27.28)	0.351
Standardized	7	31.82	9	40.90	16 (72.72)	
	Work quality					
	Poor		**Good**			
	Total	%	Total	%		
Non standardized	1	4.55	5	22.73	6 (27.28)	1.000
Standardized	4	18.18	12	54.54	16 (72.72)	
	Work behavior					
	Poor		**Good**			
	Total	%	Total	%		
Non standardized	1	4.55	5	22.73	6 (27.28)	0.333
Standardized	8	36.36	8	36.36	16 (72.72)	

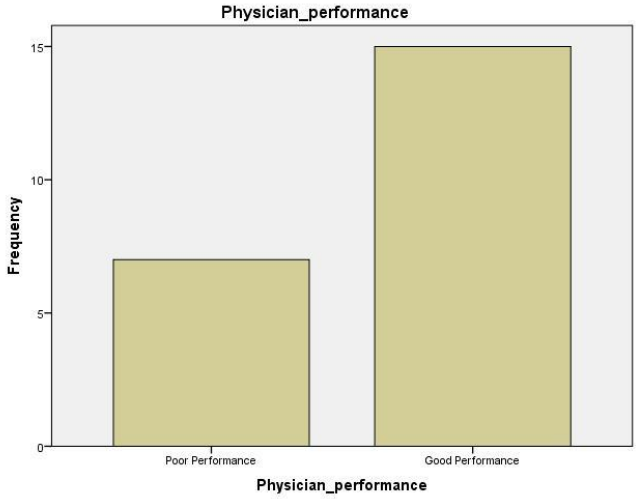

Figure 1. Frequency distribution of the performance of specialist physicians at Medan education hospital.

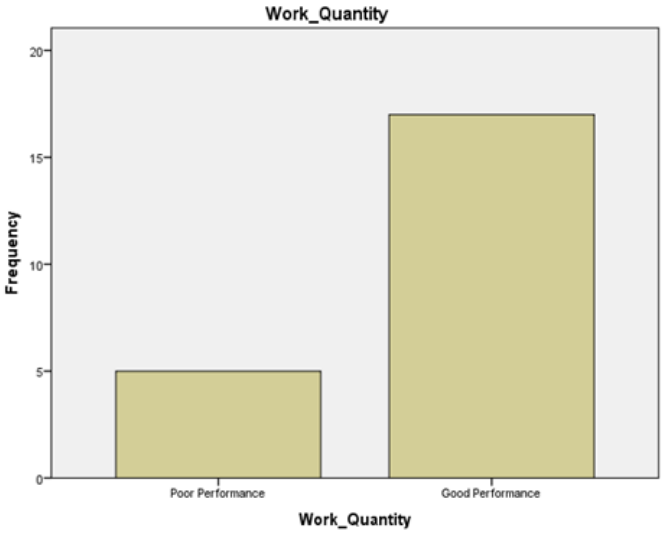

Figure 2. Frequency distribution of quantity of work done by specialist physicians at Medan teaching hospital.

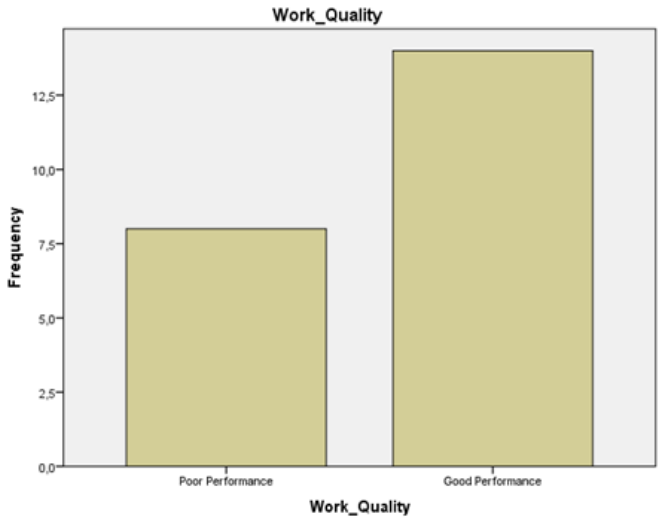

Figure 3. Frequency distribution of quality of work of specialist physicians at Medan teaching hospital.

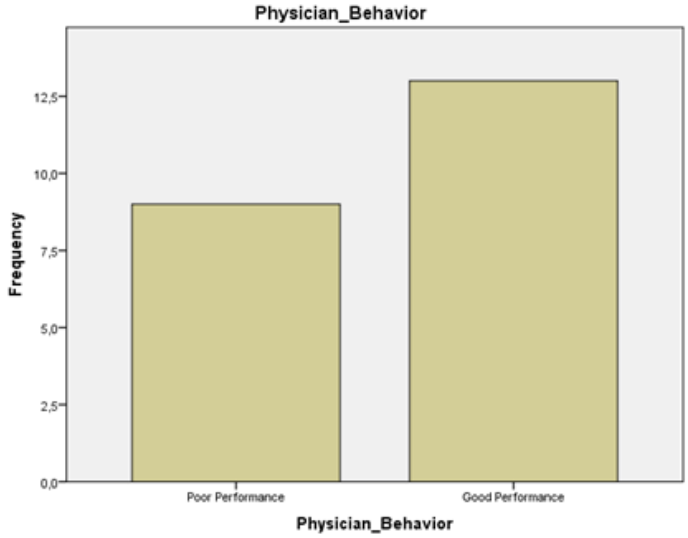

Figure 4. Frequency distribution of specialist physicians behavior in Medan teaching hospital.

DISCUSSION

Working in an environment that is too hot may cause heat balance problems. Nogueira and Talaia reported that the human body was capable to balance heat[6]. This was confirmed by Vieira et al. who reported that a comfortable air temperature was a requirement for patients being treated in an intensive care unit[7].

Working in an environment where noise exceeds the standard set will have a deleterious effect on hearing. Mattos et al. reported that propagation of noise in the working environment conditions resulted in irreversible hearing damage[8]. In addition the physiological and psychological effects of noisy environments can have a negative impact on health and quality of life. Lopes et al. reported that noise was an important risk factor for physical and psychological health problems in workers, as well as reducing productivity and work[9]. Sáet et al. reported that long-term exposure to noise could cause hearing loss, intolerance to loud sounds, headaches and irritability[10].

Kozaki et al. reported that inadequate daylight caused desynchronization of the sleep and wake cycles, resulting in sleep problems[11]. Coelho reported that working with office window shades open was related to job satisfaction, in other words, working in an environment where there was sufficient light made work objects easy to see so that work was easy and fast to do[12]. From these two studies it can be concluded that the lighting in the workplace must be adequate for the nature of the work. Adequate workplace lighting contributes to safety, prevents accidents and reduces ocular and general fatigue[13].

The concentration of dust in the workplace was below the specified standard, indicating that sanitary systems were operating effectively. Dust in the workplace generally originates from street dust brought in on people's footwear or by the wind. Continuous inhalation of dust during work will eventually cause respiratory problems and

lead to a decrease in lung function. Suma'mur reported that exposure to dust in the working environment conditions resulted in pneumoconiosis (respiratory problems)[14]. The nature of the respiratory problems will depend on the type of dust that is inhaled.

Leblebici reported that aspects of the working environment conditions such as lighting, ventilation and temperature were some important for workers[15]. The majority of respondents (29 out of 50, 58%) strongly agreed that working environment conditions were important to improve the work performances.

Physician specialists are required to work to particular standards when carrying out examinations and diagnostic procedures and should be punctual, show initiative and be reliable, obedient, cooperative and sincere when treating patients.

The results of this study conflict with those of Coelho, who found that working environment conditions, such as lighting, air temperature, noise and whether the curtains were open or closed, were related to job control[12]. They also conflict with the findings of Karina et al., who reported that the physical work environment (lighting, air circulation, room color, room cleanliness and noise) influenced employee performance[16], and with the research of Josephine and Harjanti, who reported that working environment conditions influenced employee performance[17].

The results of our study indicate that the quantity of work performed by specialist physicians in Medan teaching hospital was not affected by their working environment conditions. This is because many aspects of their work are not determined by their working conditions. Specialist physicians must do their work in all working environment conditions, related to emergencies cases, to avoid the overwork and endangered the patients' conditions. Heyel defined work quantity as the amount of work carried out by a worker in a given period[18]. This indicated of the workers in their duty that using a certain time and promptness in completing responsibilities. Thus, the work quantity indicated from the amount of work (quantity) and time.

The results also show that working environment conditions were not related to the quality of work or behavior of specialist physicians. The quality of work of specialist physicians is determined by their skills and competence. Indah and Kapalawi reported that human resources in hospitals basically have been clearly specialized, because all medical personel have a background education in accordance to the field of work they are working on[19]. With this educational background, human resources in hospital organizations are expected to be able to support quality hospital services. Kusumawati reported that the competence of a doctor depends not only his or her clinical skills and knowledge, but also on good behavior[20]. This is because the doctor will have to interact with patients and be able to communicate with and behave towards patients in accordance with their wishes.

A specialist physicians' good performance will be reflected in patient outcomes and patient satisfaction. Poor performance by the specialist physicians will mean a low-quality health service and patients will ultimately suffer, because they will pay more for treatment and take longer to recover. Doctors are the mainstay of hospitals and the main providers of healthcare in hospitals. Based on the National Health System, qualified doctors are required according to the demands of health development needs[21,22].

The quality of specialist physicians work must be high as they are responsible for providing care and services to patients, implementing standard operating procedures (SOPs) related to medical treatment and making patients feel satisfied with the health services they receive. Poor quality work will lead to diagnostic errors and worsen patients' health. Cahyani et al. found that the high work quality along with competence improvement had implications on the doctors' performance (in terms of providing quality health services)[23].

Specialist physicians must be able to meet quantity targets for procedures such as taking medical histories, examining patients, completing patients' notes, carrying out medical procedures and doing ward rounds. If specialist doctors do not do enough work tasks will accumulate, there will be inaccuracies in patients' medical records, diagnoses will be delayed and the healthcare service will be less effective. Aamodt reported that completion of tasks (work quantity) was one variable that could be used to measure of workers' performance[24].

Specialist physicians must behave appropriately when dealing with patients, they must show initiative, be reliable, obedient, able to cooperate and show an attitude that will help patients recover. Poor behavior will lead to suboptimal patient outcomes and delay recovery. Aamodt reported that measuring workers' behavior was one of way of assessing their performance[24].

Doctors are calmer when working in an environment at a comfortable temperature and this is reflected in the way in which they conduct patient health checks. Mejia et al. reported that one of the four factors that influenced whether workers behave well or not was the work situation, which encompassed the working environment (temperature)[25].

The working environment conditions that meet government standards provide a comfortable, calm and safe working atmosphere that supports doctors' behavior during work[4,22]. Oliveira et al. reported that working in a hot environment could have negative effects on health, wellbeing, performance and productivity[26], and similarly, Rodrigues et al. reported that hot environments had a direct impact on workers' performance[27].

Kroemer and Kroemer reported that above a certain threshold, noise in a workplace could make it difficult to communicate, create negative emotions (shock, frustration, and anger), interfere with sensory and perceptive abilities and thereby reduced performance and temporarily or permanently impair hearing[28]. It is therefore necessary to control noise in the workplace by installing noise absorbers or barriers.

Kroemer and Kroemer reported that the inadequate lighting affected workers' health, comfort and the ability to complete the responsibilities[28]. Adequate lighting helps one to see objects more clearly.
Generally, the dust in the specialist physicians' work room comes from street dust brought in by the wind or on footwear. Based on our measurements the concentration of dust in the workplace was in accordance with the standard, but it did not affect the performance, work quantity, work quality, and behavior of the specialist physicians'; which means that the specialist physicians' performance and patients' care treatment was not determined by conditions of dust concentration below the adjusted standards. Contrary, Mejia et al. reported that the dust could affect the worker performance[25]. Besides, it is also supported by other factors such as ability (intelligence) and competence (interpersonal skills, knowledge of work, ability and expertise in doing work) and motivation (reward and punishment), individual factors such as physical and mental health, stability of thinking when carrying out assessments, relationships with colleagues, customers and other professionals and relationships with family).

CONCLUSION

Overall, the working environment conditions for specialist physicians at Medan teaching hospital were not yet in accordance with the standards set by RI Minister of Health Regulation No. 1204 of 2004. The performance of specialist physicians was mostly good. The working environment conditions did not influence the performance of specialist physicians. The temperature of the working environment conditions affected the behavior of specialist physicians.

FUNDING SOURCE

Directorate General of Research and Community Service of Directorate General of Research and Development Reinforcement the Ministry of Research, Technology and Higher Education

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