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Current Duty Arrangements and Circumstances of Emergency Medical Technicians: Findings of an Electronic Questionnaire Survey Conducted at the 16th National Ambulance-Crew Symposium

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To assess the working arrangements and effects on the health of medical emergency transport personnel, we conducted an electronic questionnaire survey among participants of the 16th National Ambulance-Crew Symposium in 2008. Answers were obtained from 58 participants (56 males, 2 females): 58 questionnaires were fully completed and suitable for analysis. Of the 58, 47 respondents were emergency medical technicians (including those with additional roles). In the analysis of the responses, we observed a negative correlation between the number of emergency transport dispatches (in 1 day) and total nap time, and between the number of night emergency transports per shift and quality of sleep. These findings suggested that an increase in the number of emergency transports was associated with a decrease in nap time and sleep quality.

Key words: emergency paramedics; nap; workplace

Until 2005, the number of emergency transport dispatches in Japan had increased annually. The number of dispatches decreased in 2006, but rose again in 2007. Since 2005, the annual number of emergency transport dispatches had been in excess of 5,000,000 (Fire and Disaster Management Agency, 2008a). In the emergency medical care system of Japan, fire departments are responsible for emergency medical transport. Emergency medical technicians perform emergency medical care at the scene and transport patients to hospitals. An ambulance team consists of 3 people, and always includes a captain. At least 1 of the 3 personnel is a qualified ambulance paramedic.

Emergency medical technicians are on duty for 24 h per shift from 8:30 AM until 8:30 or 8:40 AM the next day. The working hours include breaks and sleep time. Due to the increase in the number of emergency transport dispatches, personnel have been unable to take their designated break and sleep times. Degrees of fatigue and stress vary among emergency medical technicians (Takahashi et al., 2005). A study of ambulance paramedics in Tottori Prefecture found an increase in general fatigue and health problems. Despite this, few personnel reported chronic fatigue or lack of motivation due to working conditions (Hosoda et al., 2006).

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Table 1. The characteristics of respondents to the electronic questionary survey (*n* = 58)

Characteristics	Median [range]	Respondent Number (%)
Age (year)	40 [19–57]	
18–19		1 (2)
20–29		11 (19)
30–39		15 (26)
40–49		22 (38)
50–59		9 (16)
Gender		
Male		56 (97)
Female		2 (3)
Team or Staff		
Ambulance team member*		47 (81)
Fire Suppression team member		4 (7)
Rescue team member		1 (2)
District Command team member		2 (3)
Staff of Fire Defense Headquarter or other facilities		4 (7)

*Including members in additional posts.

Materials and Methods

The electronic survey was conducted during the opening discussion of one of the programs of the 16th National Ambulance-Crew Symposium held on January 25, 2008. The theme of the open discussion was the actual working conditions and state of health of emergency medical technicians. The survey method was as follows: questions were shown on a large display screen and respondents answered individually on handheld keypads. Therefore, individuals were able to choose whether to respond to the questions or not. The sleep time we investigated in the present study was the period of sleep. Similarly, the nap time was the period of sleep during office hours.

Data analysis

The responses to each question were collated for analysis. Spearman's rank correlation coefficient tests were performed to identify significant associations. Statistical analyses were performed using SPSS version 11.0 (SPSS Japan, Tokyo, Japan).

Results

Fifty-eight of the questionnaires were fully completed and suitable for analysis. Table 1 shows the characteristics of the survey respondents. The median age was 40 years, with a range of 19 to 57 years. The majority of the respondents were male (56 males, 2 females). Forty-seven of the respondents were emergency medical technicians (including those with additional roles). Table 2 shows the characteristics of the emergency medical technicians. The median age was 40 years, with a range of 25 to 57 years. Twenty-five (53%) of the paramedics held the position of captain. The median length of service was 21 years (range, 2–36 years).

The median number of emergency transports per shift was 7 (range, 1–15), of which 2 (1–15) were at night. The median total nap time per shift was 4 h (range, 2–5 h). Six persons (13%) took naps in private rooms at firefighting stations, and 87% took naps in shared rooms. The median sleep time immediately following the duty period was 6 h (range, 4.5–10 h). The median sleep time on days off was 7 h (range, 4–9 h). Twelve persons (26%) were dissatisfied with their quality of sleep.

Table 3 shows significant findings of the correlation analysis. There was a negative correlation between the number of emergency transport dispatches (in 1 day) and total nap time, and between the number of night emergency transports per shift and quality of sleep.

Discussion

The average age of reserve firefighting staff in Japan was 41.8 years in April 2007, different to that found in this investigation. The participants in this survey were not representative of reserve firefighting staff. The percentage of firefighters also working as reserve ambulance team members observed in this investigation was 81%. In contrast, the percentage of reserve firefighting staff in Japan who were also ambulance team members was 38% in

Table 2. The characteristics and findings from surveyed ambulance team members

Characteristics		Median [range]	Category	Respondent Number (%)
Total number				47 (100)
Gender			Male	46 (98)
			Female	1 (2)
Age group	(year)	40 [25 – 57]	20–29	8 (17)
			30–39	14 (30)
			40–49	19 (40)
			50–59	6 (13)
Position on ambulance teams			Captain	25 (53)
			Member	22 (47)
Size of firefighting headquarters (number of personnel)			0–199	14 (30)
			200–399	4 (9)
			400–599	4 (9)
			600–799	9 (19)
			800 and over	16 (34)
Length of service	(year)	21 [2 – 36]	0– 9.9	9 (19)
			10–19.9	9 (19)
			20–29.9	23 (49)
			30 and over	6 (13)
Ambulance paramedic duty arrangements			2 part system	29 (62)
			3 part sysytem	17 (36)
Geographical feature of jurisdiction area			Daily	1 (2)
			Urban	38 (81)
			Rural	2 (4)
			Others	7 (15)
Number of emergency transports per shift		7 [1 – 15]	0– 2	4 (9)
			3– 5	14 (30)
			6– 8	16 (34)
			9–11	12 (26)
			12 and over	1 (2)
Length of time required for emergency transports	(min)	60 [33–170]	30– 59	16 (34)
			60– 89	25 (53)
			90–119	4 (9)
			120 and over	2 (4)
Number of night emergency transports per shift		2 [1 – 5]	0–1.9	9 (19)
			2–3.9	31 (66)
			4–5.9	7 (15)
			6 and over	0 (0)
Total nap time per shift	(h)	4 [2 – 5]	0–1.9	4 (9)
			2–2.9	19 (40)
			3–3.9	14 (30)
			4–4.9	9 (19)
			5 and over	1 (2)
Sleep time after the duty	(h)	6 [4.5–10]	4–5.9	8 (17)
			6–7.9	27 (57)
			8–9.9	12 (26)
Sleep time on days off	(h)	7 [4 – 9]	4–5.9	5 (11)
			6–7.9	23 (49)
			8–9.9	19 (40)
Structure of nap rooms			Private room	6 (13)
			Shared room partitioned with screens	21 (45)
			Shared room not partitioned by screens	20 (43)
Quality of sleep			Quality of sleep satisfaction	11 (23)
			Dissatisfaction	12 (26)
			Neither	24 (51)

Table 3. Significant findings from Spearman's rank correlation coefficient test on associations between responses

Test item	Number of transports	*r*	*t*	*P*
"Number of emergency transports per shift" versus "Total nap time per shift"	47	–0.487	–3.743	0.0005**
"Number of night emergency transports per shift" versus "Quality of sleep"	47	0.393	2.869	0.0062*

* $P < 0.01$.
** $P < 0.001$.

April 2008 (Fire and Disaster Management Agency, 2008a, 2008b). The difference between these findings is likely to be due to data collection methods. It is likely that the findings were affected by the fact that the symposium where the research for this paper took place was intended for emergency medical technicians. There is no information available regarding the percentage of different ranks (e.g., captains) within the national emergency services. However, the nature of the symposium predetermined a high percentage of captains amongst attendees.

There was a median emergency transport of 7 during 1 duty day, with a median dispatch time of 60 min. From this, it can be estimated that the minimum time required for dispatches per shift was 7 h. There are no national figures available for the average number of emergency transports per shift; however in 2004, the average number of emergency transports by the Tokyo Fire Department was reported to be 8.7. The median total nap time on duty days was 4 h. According to the Tokyo Fire Department's rules on working hours, emergency medical technicians working 24-h shifts must work 16 h during a duty day (Motohashi et al., 2005). Therefore, it seems likely that when there are a high number of emergency calls, most of paramedics' time is occupied by emergency transport-related duties.

Significant associations were found between the average number of emergency transports per shift and total nap time per shift, and between the average number of night emergency transports per shift and sleep quality. These findings suggested that an increase in the number of emergency transports was associated with a decrease in nap time and sleep quality. However, only 13% had access to private rooms for nap purposes. Therefore, making improvements in sleeping facilities is necessary for the health of ambulance team members.

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