

原 著

Measurement of psychic fatigue by a flicker in our employees suffering the Mid Niigata Prefecture Earthquake in 2004

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Objective : Psychic fatigue in close relation with post—traumatic stress disorder (PTSD) was studied in our employees with a portable flicker examiner in the third week after the strong earthquake hit on October 23 rd. in 2004. **Study design :** Thirteen cases were examined with a flicker marketed as "Mepica" by Hirobo Co. The degree of mental fatigue was classified based on the document of maker's announcement and, furthermore, reevaluated statistically by 5—point scale. **Results :** On the 5—point—scaled evaluation of psychic fatigue, our cases were judged to be the healthy group with the point of 3.3 ± 0.2 (mean \pm standard deviation). The coefficient of variance was 6.3%, which being less than 10% and, furthermore, regarded as a less variance and an adequate precision. **Conclusion :** We could objectively judge the psychic fatigue of the employees who suffered an earthquake. The portable flicker can be one of the useful tools for evaluating the psychic fatigue certainly because of its low coefficient of variance.

Key words : the Mid Niigata Prefecture Earthquake in 2004, Niigata—ken Chuetsu Jishin, earthquake in Niigata—prefecture Chuetsu—district, Nagaoka district, psychic fatigue, post—traumatic stress disorder (PTSD), flicker, Mepica

Introduction

On an industrial health care, both the excessively heavy labor as physical fatigue and the mental health care for psychic fatigue become important lately. In the latter case, it is important for health supervisors to measure the degrees of both stress and psychic fatigue adequately.

At the health management in industrial workplaces by health supervisors the investigation consisted of a working environment, a working procedure, a healthy examination, and a degree of fatigue judgment. The measuring methods of fatigue included followings : (1) a fatigue awareness questionnaire test or a flicker test for the measurement of psychic fatigue, and (2) a tapping test, a naming test of color, a knee jerk test, a passometer, or a urinary protein concentration per serum creatinine of 1 g for the measurement of physical fatigue. For a measurement of psychic fatigue the flicker test designed for an optic—brain

reaction has been used conventionally because of its simple processing and stable results. Although a flicker had been hard to handle because of its hugeness as an instrument, its utility value rose still more because of its miniaturization.

We had a pretty strong earthquake in Niigata—prefecture Chuetsu—district, on October 23 in 2004, so—called the Mid Niigata Prefecture Earthquake in 2004 (in English) or Niigata—ken Chuetsu Jishin (in Japanese). Both our homes and workplace were destroyed and many employees were completely defeated physically and mentally. The unhealthy rate worse from 10.3% to 33.3% before and after the earthquake respectively and 74.2% of subjects complained medical problems based on the interview survey for 2,317 adult refugees (80% was more than 40 years old) at the second week after the earthquake reported from the Division of Health in the Department of Welfare and Health in Nagaoka City Government in November, 2004. For earthquake victims with trauma reaction in refugees the mental intervention method for post—traumatic stress disorder (PTSD) was regarded to be of paramount importance, but there were few reports pointing out the necessity to reveal a health investigation in workplaces. We used a portable flicker instrument, measured the psychic fatigue of suffered employees in our workplace, and reported in this paper.

Materials and Methods

Cases : We examined thirteen full—time employees in Pathology Center of Niigata—prefectural Public Welfare Association of Japan Agricultural Cooperatives (JA) in Nagaoka city, consisted of nine men and four women, aged from 25—to 57—year old. Their homes lay in Koshiji town, Tochio city, and Nagaoka city just close to the epicenter of earthquake with a magnitude intensity of 6.8.

Examined date : We measured on the 20 th day after the occurrence of earthquake, sufferers were thought to hold some expectation of recovery in spite of many successive aftershocks. It was also at 16 : 00 on Friday when the load of duties was greatest among whole working hours.

Examiner and Method : The measuring method was in—

structed to examinees by the same person that mastered the machinery. The measuring machinery aimed to measure a fatigue of brain (digital flicker HE-100 marketed as Mepica by Hirobo Co, address : 〒726-8614 530-214, Motoyama-cho, Fuchuu-city, Hiroshima-prefecture, phone : 0847-41-6780, FAX : 0847-41-8902, homepage address : <http://www.hirobo.co.jp/newdiv/mepica/mepica.html>, Photo 1 : external appearance of Mepica).

Evaluation : The degree of mental fatigue was judged on the criteria of fatigue classification based on the document of maker's announcement and, furthermore, reevaluated statistically by so-called 5-point scale (Table 1).

Results

Without considering the generation of cases, the observed flicker values were 30.7 in the minimum and 35.2 in the maximum. On the revised classification by 5-point scale according to the generation, the minimum value was 2 and the maximum one was 5, with 3.3 ± 0.2 as mean value \pm standard deviation. In other words the mean value of whole employees in our workplace was 3.3 and all cases were judged being in the mentally healthy group.

The coefficient of variance was 6.3%, which being less than 10% and, furthermore, regarded as a less variance and an adequate precision.

Discussion

Lately both an excessively heavy labor and a mental health care have been emphasized from an accident suit and a side of compliance. Since the Dentsu court, the compliance of the safe (health) consideration duty of a worker becomes more important for an enterprise as a responsibility based on the Occupational Safety and Health Act. Five managements in an industrial health service as duties were legally binding and, furthermore, the health care in such a disastrous situation should be also emphasized. It was interesting that we were able to inspect objectively the psychic disturbance of employees who experienced a tragic earthquake with a portable flicker of a simple instrument.

In Kobe earthquake (so-called Hanshin-Awaji Daishinnsai) the 10% of refugees in the temporary houses developed PTSD one year later. Our some staffs should also live in the temporary houses as refugees, one of whom held a new-born infant. In these circumstances, we investigated the staff's fatigue on the day when several weeks had passed from the disastrous day and the fatigue

of employees accumulated, which was lucky that we were able to confirm employees in a comparatively good state on mental health. We confirmed the vigor of employees to recovery from the earthquake-induced damage.

Though unbecoming to a medical article, we concluded with the words "Never be depressed by the earthquake, we will do our best to reconstruct."

Supplementary

The health counseling on the phone for earthquake-suffered employees was provided by Niigata Industrial Health Promoting Center of Japan Labour Health and Welfare Organization (<http://www.niigataOHPC.rofuku.go.jp/>) from November 2, 2004 (private free dial : 0120-756-067, toll free).

Reference

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和 文 抄 録

新潟県中越地震被災後事業所従業員の精神的疲労のフリッカー測定による判定に関する検討

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目的：余震の治まらない地震発生20日目の週末・業務終了直前において、被災事業所従業員の精神的疲労の程度をフリッカーを用いて測定した。対象と方法：対象は13名の男女で、ヒロボー社製メピカによる点滅光源の識別周波数を測定した。疲労度の判定は、業者作成の疲労判定表に基づいた。成績：疲労の5段階評価上、 3.3 ± 0.2 で、健康エリアと判定された。結論：被災地に居住する従業員の精神的疲労を客観的に判定でき、作業管理と健康管理上、有意義であった。

キーワード：新潟県中越地震、長岡地区、精神的疲労、心的外傷後ストレス障害（トラウマ反応、PTSD）、フリッカー、メピカ

Table 1. the degree of fatigue in the age bracket based on the declared maker's value

five degrees of fatigue/age	20	30	40	50 and above
5 (excellent)	39.5≤	37.9≤	37.8≤	35.1≤
4 (healthy)	37.9≤	34.7≤	35.0≤	31.8≤
3 (healthy)	34.3≤	32.9≤	31.4≤	29.4≤
2 (healthy)	32.9≤	31.9≤	30.8≤	27.4≤
1 (exhausted)	<32.9	<31.9	<30.8	<27.4

Table 2. Results

sex	age	observation value of flicker	5 - point scale
male	25	33.5	2
male	34	35.5	4
female	36	33.7	3
male	42	32.8	3
male	46	33.6	3
female	49	33.6	3
male	49	33.5	3
male	52	31.3	3
female	54	31.9	4
male	55	35.2	5
male	56	34.8	4
male	57	31.5	3
female	57	30.7	3

mean value=3.3±0.2

coefficient of variance=6.3% (<10%)

