

Original Research

**EXPOSURE TO RADIATION WELDING WORKERS IN PT.PUTRA SULTRA
SAMUDERA KENDARI AGAINST DISEASE DISORDERS CATARACT**

Abdul Rahim Sya'ban*

School of Health Mandala Waluya Kendari, Southeast Sulawesi Province, Indonesia

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***Correspondence:**

Abdul Rahim Sya'ban, MPH

E-mail : abdulstikesmw@yahoo.co.id

ABSTRACT

Background: In the industrial sector, the number of workers employed quite a lot, with the type and intensity of the various aspects of the environment including physical, chemical, biological and psychosocial. Various kinds of environments can cause a variety of occupational diseases.

Aim: To determine the relationship between distance and time exposure PT. Putra Sultra Samudera Kendari against cataracts

Methods: This research was a survey research with cross sectional analytic study, the data collection were accomplished in a certain time to describe the condition of the population

Results: The results showed a strong relationship between the suitability of distance, time of exposure to diseases cataracts

Conclusions: There was a positive correlation and significant influence between the suitability of the distance and time of exposure with cataract disorder, the use of Personal Protective Equipment showed a positive relationship and did not have a significant effect on cataract disorders in workers in the welding parts firm PT. Putra Sultra Samudera Kendari.

Key words: Radiation exposure, The suitability of distance, Time of exposure, Cataract diseases

BACKGROUND

Development in Indonesia so rapidly in various fields including industry, services, property, mining, transportation, and others. But behind this progress there is a price to pay the people of Indonesia, that the resulting negative impact in the form of disasters, accidents, pollution and occupational diseases that lead to thousands of injuries each year

Based on data from the Social Security number of work accidents in Indonesia, namely the year 2004 as many as 95 418 cases, in 2005 as many as 99 023 cases, this makes Indonesia as a country

that has the most accidents universities in ASEAN equivalent to two other countries of Bangladesh and Pakistan, which in 2006 were 95 624 cases, in 2007 as many as 83 714 cases, in 2008 as many as 93 823 cases in 2009 were 54 398 cases, in 2010 as many as 98 711 cases and in 2011 as many as 9486 cases.¹

In the year 2010 saw a high number of Social Security claims, which reached Rp. 400,000,000,000. That same year, the Social Security recorded as many as 98 711 cases of occupational accidents and cases of as many as 2,191 workers died

and 6667 people suffered permanent disabilities.² The other side is believed to be still a lot of work accidents are not reported, so that accident data above is an iceberg phenomenon. The high number of occupational accidents both the frequency and the severity level to be one of the factors that increase the cost of production and cause economic loss.³

Shipbuilding industry, the shipbuilding steel welding job numbers roughly a third of all workers. Welding is also carried on the ship repair work. During the welding process will arise ultraviolet radiation and infrared, which can jeopardize welding workers. Ultraviolet light is included in the physical factor and can cause disease in the eyes, one of which is a cataract.

Eye diseases due to radiation generated in welding work between energy absorption and biological effects exist latent period varies depending on the length and intensity of the light pressure and, depending on the affected tissue. Network vulnerability also varies depending on the ability of the tissue repair. On radiation injury also occurs when the cumulative effect of repeated radiation

The World Health Organization states that cataract is a clouding of the eyepiece. In 1984, an estimated 27-35 million people are blind and nearly 50% due to cataracts.⁴ In Indonesia based on the results of the eye and blindness morbidity survey in 1982 reported that cataract occupied the first place as a cause of blindness. Sight is one of the vital organs that must be properly maintained. In the work, the worker must have knowledge of all sorts of objects that can threaten the health and safety of the eye and know how protection.⁵

Company PT. Putra Sultra Samudera Kendari is a formal company that stands below the ocean fishing port

industrial area of Kendari, most employees work as welding plate and propeller to barges and ferries. Workers weld PT. Putra Sultra Samudera Kendari amounted to 32 people conducting welding using AC and DC electric welding working from 08:00 am until 16:00 pm, but sometimes through the night if pursued target of usage. The average incoming ships dock in the company PT. Putra Sultra Samudera Kendari \pm 45 vessels per year who perform repairs and repair parts of the ship. Especially for replacement of ship plate is usually done for 2 weeks with radiation exposure on an ongoing basis. The type of personal protective welding is used workers face masks and rubber gloves to protect themselves from exposure to hot objects or incandescent radiation.⁶ The use of AC electric welding to welding of the tank vessel in addition to exposure to radiation is usually impaired worker was electrocuted so for welding, which is performed in the tank workers typically, use DC welding according safer workers. Age welding workers at PT. Putra Sultra Samudera Kendari average age of 30-56 years with complaints of disturbances in visual acuity and eye irritation, and some have been doing treatment at health centers become a reference center for Social Security for workers.⁷

Under these conditions, conducted research on the effects of radiation exposure in terms of the suitability of distance, time of exposure and the use of personal protective equipment against interference cataract disease in workers weld PT. Putra Sultra Samudera Kendari.

METHODS

This research is a survey research with cross sectional analytic study, the data collection is done in a certain time to describe the condition of the population. The research population is all employees who work at the company dock ship in PT.

Putra Sultra Samudera Kendari that then the total sampling method obtained by respondents as many as 32 people.

Criteria for inclusion in this study is the workforce at the Welding Company PT. Putra Sultra Samudera Kendari who are permanent employees of the company and has been working for 5 years while the exclusion criteria are those who are not willing to become respondents in this study.

Analysis was done using univariate, bivariate and multivariate correlation test and logistic regression.

RESULTS

Measurement and data collection activities carried out in 3 stages first stage is a direct examination of the eye sclera to identify cataracts workers by a team of doctors, the second phase of the research questionnaires to measure variables subjectively, the three perform measurements using a lux meter. Questionnaires were distributed as many as 32 bundles of the employees of PT. Putra Sultra Samudera Kendari.

Tabel 1. Distribution of, Disorders of sclera, Checkup Category, Distance welding, Exposure time, and Use safety first.

Disorders of sclera	Frequency	Percentage
Non cataracts	23	71,88
Imatur cataracts	7	21,87
Pterigium	2	6,25
Total	32	100
Checkup Category	Frequency	Percentage
Cataracts	7	21,87
Non Cataracts	25	78,1
Total	32	100
Distance welding	Frequency	Percentage
Appropriate	30	93,75
Inappropriate	2	6,25
Total	32	100
Exposure time	Frequency	Percentage
exposure	16	50,00
unexposed	16	50,00
Total	32	100
Use safety first	Frekwensi	Persentase
Wearing	32	100,0
Not Wear	0	0
Total	32	100

Of the 32 samples were measured, there were 7 people (21.9%) of workers welding cataract disease patients and 25 (78.1%) of workers who do not weld cataract disease. Of the 32 samples that measured 30 men (93.75%) of workers who pay attention weld welding distance

and 2 (6.25%) workers who do not pay attention to weld welding distance. there were 16 (50.0%) of workers exposed to welding exposure time in doing welding and 16 (50.0%) of workers are not exposed to weld no exposure time.

2. Analysis variable

Tabel 2. Tabel correlation test

Variabel		Validity	
Independent	Dependent	Corelasi (r)	Sig (p)
Suitability of range		0,656	0,000
Exposure time	Gangguan Katark	-0,527	0,002
Use safety firs		0,844	0,036

Based on the value of the relationship between the personal protective equipment with cataracts have a

correlation coefficient of 0.036 with a significant value for 0844 ($p > 0.05$), accept HO.

Tabel 3. Table Koefisien Regresi CI 95% Exp

Variabel	Coefisien Regression	p	Exp (B)	95% CI for Exp	
				Lower	Upper
Suitability of range	2.060	0,034	7,843	1,166	52,769
Exposure time	-1.257	0,036	0,284	0,088	0,921
Use safety first	- 0,807	0,464	0,446	0,051	3,870
Constant	1.797	0,754	6,033		

Based on the results of the analysis showed that the constant shows the value of regression coefficient 1,797 (positive) with Exp (B) = 6,033, meaning that if it does not consider the factors that influence the occurrence of cataracts, then the patient would be likely to have cataracts.

DISCUSSIONS

The study demonstrated the suitability of range has a significant influence on the occurrence of cataracts. The higher the score the suitability of range, then the tendency will happen cataracts would be lower. And vice versa, the lower the score the suitability of range, then the tendency will happen cataracts will be higher. From the results of research on visual acuity for electric welding workers in Surakarta Semanggi market showed 23.08% of respondents surveyed

mild impaired visual acuity and 30% of respondents experienced conjunctivitis.⁸

The probability that a patient will tend to have cataracts by the exposure time high scores, at 22:14% (CI: 8:07% - 47.95%), with a significance value of 0.036 ($P < 0.05$, reject H_0 , so that the exposure time had a significant effect on the occurrence of interference cataracts. This means that the higher the score the time of exposure, the tendency will happen cataracts will be higher. And vice versa, the lower the score the time of exposure, the tendency will happen cataracts would be lower.

The probability that a patient will tend to have a cataract with a score lower personal protective equipment, amounted to 30.86% (CI: 4.9% - 79.46%), with a significance value of 0.446 ($p > 0.05$), HO received, so that personal protective

equipment have no effect significantly to the occurrence of cataracts. In the welding industry, working conditions could potentially impact on workers in the form of light generated in the welding process.⁹ Ray include visible light, infrared rays and ultraviolet rays.¹⁰ Fatigue in the eye can be as if the eye is filled by sand,¹¹ blurred vision¹² and eye ache is felt workers showed that the welding process are the rays that harm the eyes.¹³ Welding workers do not routinely wear eye glasses resulting weld welding workers exposed directly by visible light, infrared rays and ultraviolet rays. As a result of direct exposure to the rays are radiation can cause disturbances in visual acuity welding workers.¹⁴

The results showed a strong relationship between the suitability of range, time of exposure to diseases cataracts. Knowledge of welding techniques need to be applied it is related to the severity of radiation-induced cataracts experienced workers¹⁵ and personal protective equipment is not a risk factor for cataract caused disruption in the implementation of labor work welding already using personal protective equipment, especially in the area of the face in the form of a face mask, safety helmet and gloves even though the type of personal protective less adequate.

CONCLUSIONS

The conclusion of this study was to show there was a positive relationship and a significant influence between the suitability of range and the time of exposure to diseases cataract while the use of Personal Protective Equipment does not indicate the existence of a positive relationship and did not have a significant effect on diseases cataract workers welding parts in company PT. Putra Sultra Samudera Kendari.

So, we need the support of the company's management to pay more

attention to the procedures and standard operational procedure are good for workers, especially in the management of welding work in the field, the need for supervision and guarantees for workers who suffered health problems, especially for those who experience a disruption in the function of vision and the need for monitoring agency employment for example Committee of occupational Safety and Health P2K3 an active role collect and manage all data and or problems of occupational safety and health as well as helping entrepreneurs or hold management and improve counseling, supervision, training, and research on occupational safety and health.

REFERENCES

1. Baihaqi R. Sepanjang 2013 192.911 Peserta Jamsostek Alami Kecelakaan Kerja.
2. Jamsostek P. Jaminan Kecelakaan Kerja 2007.
3. Kusuma IJ. Pelaksanaan Program Keselamatan dan Kesehatan Kerja Karyawan PT Bitratex Industries Semarang: Semarang. Universitas Diponegoro; 2010.
4. Harrington JM, Gill FS. *Occupational health*: Blackwell Scientific Publications; 1983.
5. Manuputty M, Setyawati L. Hubungan antara Paparan Radiasi Sinar Las Dengan Kejadian Katarak Pada Pekerja Las di PT. DOK dan Perkapalan Kodja Bahari (Persero) UPJ II Jakarta. *Sains Kesehatan*. 2004;17(2004).
6. Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: evidence review. *Occupational medicine*. 2001;51(2):124-135.
7. Samudera PS. Profil PT Putra Sultra Samudera 2014.

8. Trisnowiyanto B. *BEBERAPA FAKTOR YANG BERHUBUNGAN DENGAN KETAJAMAN PENGLIHATAN PEKERJA LAS LISTRIK DI PASAR BESI TUA SEMANGGI SURAKARTA TAHUN 2002*, Diponegoro University; 2002.
9. Moss C, Ellis R, Murray W, Parr W. Infrared radiation. *World Health Organization. Manual on health aspects of exposure to nonionizing radiation. Copenhagen, Denmark: World Health Organization Regional Office*. 1980.
10. Tenkate TD. Occupational exposure to ultraviolet radiation: a health risk assessment. *Reviews on environmental health*. 1999;14(4):187-210.
11. Gurney TR. *Fatigue of welded structures*: CUP Archive; 1979.
12. Veale JH. The incidence of industrial eye injuries in New Zealand and their causes. *The Australian Journal of Optometry*. 1972;55(8):275-282.
13. Kovalenko V. Visual fatigue in precise assembly. Paper presented at: Proc. International Ergonomics Association World Conf. on Ergonomics of Material Handling and Information Processing at work, Warsaw 1993.
14. Moeljosoedarmo S. *Higiene Industri*. Jakarta: Balai Penerbit FKUI. 2008:75-82.
15. Tenkate TD, Collins MJ. Personal ultraviolet radiation exposure of workers in a welding environment. *American Industrial Hygiene Association*. 1997;58(1):33-38.

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