

Quality of Life in Children with Atopic Dermatitis

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Abstract

Background: Atopic dermatitis (AD) is the most common chronic skin disease in children which caused significant morbidity and impaired quality of life (QoL). The main goal of AD therapy is to prevent flare-ups, prolong remission and increase QoL. Therefore, the study aimed to discover QoL in children with AD.

Methods: The study was conducted at Pasundan Public Health Centre, Al Islam General Hospital and Kimia Farma Private Dermatology Clinic, from September to November 2015. This descriptive study used consecutive sampling with 24 outpatients who were admitted to the health facility and diagnosed as AD. A questionnaire on Infant Dermatitis Quality of Life for infants aged 0-4 years, and Children Dermatology Life Quality Index for children aged 5-16 years was used in this study to measure QoL.

Results: Out of 24 patients, 9 patients aged 0-4 years had mean score of 4.44 ± 4.36 , and 15 patients aged 5-16 years had mean score of 5.80 ± 3.95 . Mean SCORAD Objective in patients aged 0-4 and 5-16 was 15.61 ± 7.75 and 17.44 ± 11 .

Conclusions: The QoL in children with AD vary among patients. Most of the patients have mild-moderate impairment in QoL.

Keywords: Atopic dermatitis, children, infant, quality of life

Introduction

Atopic dermatitis (AD) prevalence in Indonesia reached 23.67%, thus making AD the most common skin disease in children.¹ Atopic dermatitis in children occurred 65% before patients reached the age of 18 months and only 60% had resolution in adulthood.² Atopic dermatitis is a chronic relapsing disease which may cause redness, itch, stinging sensation that makes major impairment in quality of life (QoL).³ Quality of life is a concept that includes a person subjective well-being of their life.⁴ Quality of life in patients can be assessed by the family and/or themselves and can evaluate aspects such as emotional, social, work / role related sign and symptoms, and medication.⁵

The main goals of AD therapy are to prevent flares, reduce severity and to improve patients QoL. It is important for clinicians to measure the QoL for evaluating the therapy of the patients.⁶ Therefore, this study aimed to evaluate the QoL in AD patients.

Methods

This study was conducted in Bandung, West Java, Indonesia. This descriptive study was carried out from September to November 2015 at Pasundan Public Health Center, Al Islam General Hospital, and Kimia Farma Private Dermatology Clinic. Consecutive sampling was performed with participants who had been diagnosed atopic dermatitis with Hanifin and Rajka criteria. The minimum sample size was calculated with Proportion Sampling Formula with 90% Confidence Interval and 15% Precision. Questionnaires to measure Infant Dermatitis Quality of Life (IDQOL) and Children Dermatology Life Quality Index (CDLQI) Cartoon Version in Bahasa Indonesia were used to determine the QoL in Infants (0-4 years old) and Children (5-16 years old) respectively. Both questionnaires have a minimum score of 0 and maximum score of 30, each question in the questionnaire has 0 points at the minimum and 3 points at the

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maximum. Prior to using the questionnaire, 8 patients were selected for each questionnaire for validity and reliability testing. The validity test result of both questionnaires used the Spearman test. While, the reliability test used Chronbach's alpha value for CDLQI cartoon version and IDQOL in Bahasa Indonesia, the result was 0.749 and 0.759 respectively. Therefore, the questionnaires were reliable. Furthermore, Self-admission or interview was conducted for the QoL in patients. All procedures performed in the study were approved by the Health Research Ethics Committee, Faculty of Medicine, Universitas Padjajaran.

This study used questionnaires to evaluate the degree of impairment from the disease to QoL. In IDQOL, parents were asked about dermatitis severity and the child's daily activities that had been impaired due to AD such as itch, mood, sleep, playing, mealtime, bath time and medication. In CDLQI the child was asked about activities that had been impaired by AD such as itch, feelings, friendship, playing, hobbies and exercise, studying, bath time, and medication. Every patient was examined for Objective SCORAD using the ETFAD form to determine the severity of AD.⁷

The inclusion criteria for this study were children aged 0–16 diagnosed with AD and

willing to fill in the questionnaire or to be interviewed which was shown by signing informed consent by parents. The exclusion criteria in this study were children that had secondary infection or had other difficulties to be interviewed. The study was divided into age group, previous medication, gender, SCORAD Objective, and admission place.

After the study, all the participants were treated with emollients and corticosteroids depending on the severity of the disease.

Results

The samples in this study were 24 patients. Furthermore, AD severity score mean value for children aged less than 5 years and children aged 5–16 year was 15.61 ± 7.75 and 17.44 ± 11.09 respectively (Table 1).

The total mean of CDLQI was 5.80 ± 3.95 . There was slightly different in gender (male vs female, 6.33 ± 2.09 vs 5.44 ± 1.08), significant different in patient's previous medication (had medication vs had not 6.73 ± 1.28 vs 3.25 ± 0.47) and slightly different in location (Primary care vs Private Clinic, 5.88 ± 1.67 vs 6.40 ± 1.63). The hospital category was omitted because only 2 persons were recorded. There was no significant different in disease severity (mild vs moderate, 5.00 ± 1.15 vs 5.13 ± 1.09). Severe

Table 1 Subject characteristics, number, and SCORAD scores

Parameter	Total	Infant (0-4)	Children (5-16)
Number of Patients	24	9	15
Gender			
Male	11	5	6
Female	13	4	9
Age (yr) (Mean±SD)	6.67 ± 4.54	1.91 ± 1.59	9.53 ± 3.02
Number of Patients per Place			
Primary Care	12	7	5
Hospital	2	0	2
Private Clinic	10	2	8
Number of Patients per Follow Up			
Follow up patients	16	5	11
New Patients	8	4	4
Number of Patients per SCORAD			
Mild	11	5	6
Moderate	12	4	8
Severe	1	-	1

Table 2 Children Dermatology Life Quality Index minimum, maximum, mean and standard deviation each component of quality of life scores

Point Described	Min-Max	Mean±SD
Itch, Stinging	1-3	1.6±0.63
Mood	0-2	0.4±0.73
Friendship	0-1	0.2±0.41
Clothing	0-1	0.2±0.41
Hobby	0-1	0.47±0.51
Exercising / Swimming	0-3	0.73±0.96
School / Holidays	0-2	0.87±0.83
Bullying / Calling Names	0-1	0.07±0.25
Sleep	0-3	1.2±1.01
Medication	0-1	0.07±0.25

categories were omitted because only 1 person was recorded. The minimum and maximum score of CDLQI were 2 and 16 respectively. The items in CDLQI with the highest score were itch 1.6±0.63, and problem with sleep 1.2±1.01. The lowest score were medication 0.07±0.25, and calling names, bullying 0.07±0.25 (Table 2).

The total mean of IDQOL score was 4.44±4.36. There was slightly different in gender (male vs female, 4.00±2.28 vs 5.00±1.95), slight different in patients previous medication (had medication vs had not 4.60±2.08 vs 3.25±2.32) and significant different in location (Primary care vs Private Clinic, 5.57±1.63 vs 0.50±0.5). There were also significant different between disease severities (mild vs moderate, 2.20±1.11

vs 7.25±2.42). Furthermore, minimum and maximum score of IDQOL were 0 and 12 respectively. The items in IDQOL highest score were itch 1.78±1.20, bath time and mood both of them scored 0.67±0.86 and the lowest score was mealtime which is 0 (Table 3).

Discussion

This study discovered that the mean score of CDLQI was 5.8±3.95, classified as mild impairment quality of life for children aged 4-16 years. This study was slightly different from previous comparable studies, which reported the score of CDLQI by Kim et al.⁸ (mean 6.6±6.3), Gånemo et al.⁹ (Mean 7.1). This study reported lower mean score on clothing,

Table 3 Infant Dermatitis Quality of Life minimum, maximum, mean and standard deviation each component of quality of life scores

Point Described	Min-Max	Mean±SD
Itch, scratch	0-3	1.78±1.20
Mood	0-2	0.67±0.86
Time need to sleep	0-2	0.22±0.67
Sleep disturbance	0-1	0.22±0.44
Playing, swimming	0-1	0.22±0.44
Family activity	0-2	0.33±0.70
Meal time	0-0	.00
Medication	0-1	0.11±0.33
Clothing	0-1	0.22±0.44
Bath time	0-2	0.67±0.86

leisure, hobby, bullying and medication than in previous studies, compared to other questions with almost the same mean score. Itch and scratch also have the highest score in the other studies, making scratch the most impairing aspect in QoL.

Moreover, this study discovered that mild and moderate AD did not have significant differences. This study agrees with the previous study that there are no correlation in QoL and severity indexes.¹⁰ In another study, Hon et al. state that moderate-severe AD is less sensitive in showing correlation to QoL than mild-moderate AD.¹¹

This study finds out IDQOL score was 4.44 ± 4.36 . Several studies reported higher score, such as Alvarenga et al.¹² (mean 9.2), Kim et al. (mean 7.6)⁸ and Beattie et al.¹³ (Median 8). This study reported lower points on almost every question except the itch. Itch also have the highest score in other studies, making scratch the most impairing aspect in QoL.

Moreover, in infants aged 0–4 years, most impairment occurred in itch and bath time, parents were also asked about the soap product for their children at bath time, 2 parents used non-soap cleanser, which may cause dryness of the skin, and thus recommendation for AD patients is to use non-soap cleanser.¹⁴ This study was also related to a previous study which reports that atopic eczema also impaired not only on physical but also on physiological treatment such as support from families, educational for long term management and chronic nature of the disease.^{13,15}

However, this study on quality of life in AD patients faced major limitations. First, limitation on the time of study. Second, the patients are selected at the dermatology division in hospital; in Indonesia hospitals cannot be accessed without the referral from a lower health care facility, while private clinics can only be accessed by the moderate-high socioeconomic status, this caused very low subjects were gathered. Third, most of the patients have mild-moderate severity, thus people who have severe disease are not evaluated. Further studies with larger number of subjects and correlation between severity indexes may provide more information.

In conclusion, quality of life in children is AD mildly-moderately impaired. This study corresponds with previous studies which have discovered that AD has an impact on patients QoL even though slightly lower.

References

1. Sularsiro S, Djuanda S. Dermatitis. In: Djuanda A, editor. Ilmu penyakit kulit dan kelamin. 6th ed. Jakarta: Badan Penerbit Fakultas Kedokteran Universitas Indonesia; 2011. p. 129–53.
2. Spergerl J. Epidemiology of atopic dermatitis and atopic march in children. *Immunol Allergy Clin North Am.* 2010;30(3):269–80.
3. Lifschitz C. The impact of atopic dermatitis on quality of life. *Ann Nutr Metab.* 2015;66(suppl 1):34–40.
4. Theofilou P. Quality of life: definition and measurement. *Eur J Psychol.* 2013;9(1):150–62.
5. Burckhardt C, Anderson K. The Quality of Life Scale (QOLS): reliability, validity, and utilization. *Health Qual Life Outcomes.* 2003;1(1):60.
6. Eichenfield LF, Tom WL, Berger TG, et al. Guidelines of care for the management of atopic dermatitis. *J Am Acad Dermatol.* 2014;71(1):1–17.
7. Oranje A, EJ G, Wolkerstorfer A, de Waard-van der Spek F. Practical issues on interpretation of scoring atopic dermatitis: the SCORAD index, objective SCORAD and the three-item severity score. *Br J Dermatol.* 2007;157(4):645–8.
8. Kim DH, Li K, Seo SJ, Jo SJ, Yim HW, Kim KH, et al. Quality of life and disease severity are correlated in patients with atopic dermatitis. *J Korean Med Sci.* 2012;27(11):1327–32.
9. Gånemo A, Svensson A, Lindberg M, Wahlgren C. Quality of life in Swedish children with eczema. *Acta Derm Venerol.* 2007;87(4):345–9.
10. Hon KL, Kam WY, Leung T, Ng PC. CDLQI, SCORAD and NESS: are they correlated? *Qual Life Res.* 2006;15(10):1551–8.
11. Hon KL, Leung TF, Wong KY, Chow CM, Chuh A, Ng PC. Does age or gender influence quality of life in children with atopic dermatitis. *Clin Exp Dermatol.* 2008;33(6):705–9.
12. Alvarenga TM, Caldiera A. Quality of life in pediatric patients with atopic dermatitis. *J Pediatr.* 2009;85(5):415–20.
13. Beattie P, Lewis-Jones MS. An audit of the impact of a consultation with paediatric dermatology team on quality of life in infant with atopic eczema and their families: further validation of the Infants Dermatitis of Life Index and Dermatology Family Impact score. *Br J Dermatol.* 2006;155(6):1249–55.

14. Ring J, Przybilla B, Ruzicka T. Handbook of atopic eczema. New York: Springer-Verlag Berlin Heidelberg; 2006. p.525.
15. Mozaffari H, Pourpak Z, Pourseyed S, et al. Quality of life in atopic dermatitis patients. J Microbiol Immunol Infect. 2007;40(3):260-4.

Visual Impairment Screening in Cibeusi Elementary School Students

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Abstract

Background: The World Health Organization (WHO) shows that there are around 153 million people with visual impairment due to uncorrected refractive error, mostly in 8–10 years. Screening of visual function in earlier age is important, because it is treatable. Correction of refractive error by using eye-glasses is the easiest and the cheapest way. This study aimed to identify the frequency of visual impairment and eye-glasses-used in children aged eight to ten in Cibeusi Elementary School.

Methods: A descriptive study was conducted. This study was held in August 2014. Data were obtained from Cibeusi Elementary School in Jatinangor; simple random sampling technique was used to select 8–10 years old students. The total number of respondent was 101 students. Screening for visual impairment was performed using E-Chart.

Result: Eleven eyes (5.44%) from a total of 202 eyes had visual impairment. Six (5.94%) students had visual impairment, whereas only 1 (1%) student used eye-glasses for improving his visual function. Visual impairment was considerably high in boy-students aged 8 years and was most prevalence in 3rd grade students.

Conclusions: There are visual impairments which are not corrected with sunglasses.

Keywords: Children, corrected refractive error; eye-glasses-used, visual impairment screening

Introduction

Visual impairment is one of the health problems which has a long-term effect and has not been solved completely by the government and health care providers. Based on the World Health Organization (WHO) in 2006, 153 million people had visual impairment due to uncorrected refractive error. Thirteen million of them were 5–15 years old.¹ Based on Basic Health Research (*Riset Kesehatan Dasar*, *Riskesdas*) in 2013, the prevalence of visual impairment in ≥ 6 years old was 0.9% in Indonesia. Lampung had the highest prevalence of visual impairment (1.7%), on the other hand, the lowest prevalence was in Yogyakarta (0.3%). In West Java, the prevalence of visual impairment was 0.8%.² A study conducted in Nigeria shows that in the 5–15 years old age group, 8–10 years old (40.7%) children had the greatest number of visual impairment.³

Uncorrected refractive error causes visual impairment, affects communication and

learning, loss of productivity causing poverty and even quality of life.⁴ Correction of refractive error by using eye-glasses is the easiest and the cheapest way than using contact lenses or performing an operation. It should be easily accessed by the community. In fact, there are limitations for performing that strategy especially in developing countries which are lack of infrastructure of eye-glasses providers, lack of training for eye-care givers, and lack of education for both parents and teachers about the importance of doing correction of refractive error. India was one of the countries that have conducted the eye examination for school-children and provided eye-glasses for children who have visual impairment as the way to decrease the number of avoidable blindness.^{1,5,6}

Furthermore, to find out whether school-aged children have visual impairment or not, the visual function screening program is held to support Vision 2020 by WHO.¹ The awareness of parents, teachers, and community to avoid blindness in their children especially caused by refractive error is poor. Since refractive

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error does not show specific symptoms, this screening program is important to be carried out.^{1,6} Training for teachers to screen visual function in school should be developed to detect visual impairment in early age. This study aimed to recognize the frequency of visual impairment and eye-glasses-used in students aged 8–10 years at Cibeusi Elementary School in Jatinangor, in 2014.

Methods

This descriptive study was conducted at Cibeusi Elementary School Jatinangor in August 2014 and. This study was approved by the Health Research Ethic Committee Faculty of Medicine, Universitas Padjadjaran.

Students aged 8–10 years were selected by using simple random sampling, and 101 students met the inclusion criteria. The age of the 8–10 years students were calculated from their last birthday to the date of examination held. The students were permitted by their parents to be involved in this study after signing informed consent letter. On the other hand, students who were having a red eye were excluded from this study.

The researcher did the visual impairment screening by using the E-Chart on a distance

of 3m; each eye separated starting from the right eye. Students with eye-glasses still used eye-glasses when screening was performed. Students had to adjust four large E-letters and four small E-letters with different directions. Those who were able to adjust at least three small E-letters were categorized as having normal eyes. While those who were able to adjust two or less small E-letters were categorized as having visual impairment. Data obtained in this study were input to Statistics Software.

Moreover, this study was conducted based on ethical aspects. This study may benefit to screen visual impairment, so both parents and teachers could give interventions, for example correction by using eye-glasses. Additionally, this study did not harm the students and they were all treated with similar manners. The involvement of the students in this study was voluntary.

Results

A total of 101 students consisting of 49 (48.5%) boys and 52 (51.5%) girls were included in this study. Students were of 3rd to 5th grade. Those who were 8 years old (39.6%) were the most common in this study. Only 1 (1%) student

Table 1 Clinical Eye Examination Based on Student's Characteristics

Characteristic	n (%)	Eye Examination	
		Normal n(%)	Visual Impairment n(%)
Gender			
Boys	49 (48.5)	87 (43.1)	11 (5.4)
Girls	52 (51.5)	104 (51.5)	0 (0)
Age (years old)			
8	40 (39.6)	74 (36.6)	6 (3.0)
9	38 (37.6)	72 (35.6)	4 (2.0)
10	23 (22.8)	45 (22.3)	1 (0.5)
Grade			
3rd	47 (46.5)	86 (42.6)	8 (3.9)
4th	29 (28.7)	55 (27.2)	3 (1.5)
5th	25 (24.8)	50 (24.8)	0 (0)
Eyeglasses-used			
Yes	1 (1%)		
No	100 (99%)		
Total	101 (100.0)	191 (94.6)	11 (5.4)

Table 2 Clinical Eye Examination

Characteristic	Right Eye n (%)	Left Eye n (%)
Eye Examination		
Normal	95 (94.1)	96 (95.0)
Visual Impairment	6 (5.9)	5 (5.0)
Total	101 (100)	101 (100)

already used eye-glasses during screening.

By using E Chart as a screening tool, out of a total of 202 eyes, 191 (94.55%) eyes had normal visual function whereas 11 (5.44%) eyes had visual impairment. The data showed that boys (5.94%) had greater number of visual impairment than girls. Students with visual impairment were considerable high in 8 years old students (3.0%) and were of 3rd grade (3.9%). Frequency of students with visual impairment was not similar with frequency of eye-glasses-used students (Table 1).

Results of clinical eye examinations showed that there were small differences of right and left eye with visual impairment. Five students had visual impairment in their both eyes and one student had one eye with visual impairment (Table 2).

Discussion

Eye examination in infant and children is conducted by eye-care providers in the Eye hospital by using pictures, and one of them is E-Chart. It is similar with the tool used in this study to screen visual impairment. E-chart is used to assess the visual function in four years old and older verbal children.^{2,7} Prevalence of school-aged children in the age group 6-14 years with visual impairment is 0.03% in a study conducted by Riskesdas 2013. The study by Teerawattananon et al.⁸ in Thailand (2014) has showed that 6.6% students have visual impairment. An other study held in Ethiopia by Sewunet et al.⁹ shows that 11.6% school-aged children have visual impairment. In this study the frequency of visual impairment among students was 5.94%. The variations of result in several studies can be due to different sampling technique methods, size of population screened, and geographical area.¹⁰

Furthermore, boys (5.94%) with visual impairment were in greater number than girls (Table 1). This is similar with the study conducted by Opubiri et al.³ in Nigeria (2013), which shows visual impairment is the most common problem in age group 8-10 years ,

and 7 from 11 children were boys. In contrast, a study conducted in Saudi Arabia proves that refractive error occurs more in girls (12%) than boys (7.7%).^{10,11} While a study conducted by Teerawattananon et al.⁸ in Thailand (2014) has concluded that there is no significant difference of occurrence of visual impairment in boys (51%) and girls (49%). There is no difference of eye development both in pre-school-age and school-age children based on their gender.⁷

According to WHO that proved that most children affected by visual impairment due to refractive error were in age group 5–15 years, this study focused on students aged 8–10 years. Moreover, 8 years old students had the greatest number of visual impairment and students were of 3rd grade (Table 1). This data is similar with a study conducted in Saudi Arabia¹¹ which shows visual impairment is most common in students aged 7–8 years and were of 3rd to 4th grade. One of the reason is students are actively growing in that age group.¹¹ The study conducted by Opubiri et al.³ in Nigeria (2013) also shows that visual impairment is considerably high in age group 8–10 years (40.7%). A study in Thailand⁸ (2014) reports that screening program has already been conducted in pre-school and primary elementary school children. The teachers get difficulties during the screening process that is performed in pre-school children, due to lack of cooperative and lack of knowledge of the children.⁸ Eye examination in early age needs parents participation to get children focus while doing the examination.⁷ So that children aged 8-10 years old were involved in this study.

The alteration of eye diameter and its curvature affects the clearance of image captured by the retina. The changes of axial length occur faster in the first three years of life, after that the changes occur slowly. In the second decade of life, the cornea will be flattened, keratinocyte will be thinner, and the endothelial cell will be changed. Lens crystalline affecting lens capability in refraction also changes in the second decade of life. Lens fiber will be produced along the

life, so it becomes thicker in older age.⁷

Moreover, data showed 1 (1%) student used eye-glasses during screening, in contrast to 6 students with visual impairment (Table 1). The study conducted by Riskesdas Indonesia in 2013 in age group 6-14 years, shows that there are 1% cases of corrected refractive error.² The study conducted in 2012 by Ghosh et al.¹² in Kolkata, India, shows that 4 (1.46%) students from the total of 273 students with visual impairment already used eye glasses. Three other studies conducted in Saudi Arabia¹¹ that have a similar purpose with this study shows three different results. First, from 18.6% students with refractive error, 16.3% students have uncorrected refractive error.¹¹ Second, in 2012, according to a study conducted by Al Wadaani et al.¹⁰ in Al Hassa, Saudi Arabia, 9.4% students with refractive error have used eye-glasses to avoid early blindness. Data in the study of compliance of eye-glasses-used in primary school children by Aldebasi¹³ shows that boys (30.87%) have poor compliance than girls (35.97%). Another study conducted in Ethiopia⁹ reports that 9.3% students with refractive error have used eye-glasses. There are several factors affecting the differences in number of eye-glasses-used in students with visual impairment. It depends on the education level and the age of people.² Besides, there is underestimation from the eye care provider in health care facilities and policy maker in the government about the importance of using eye-glasses for visual impaired children. The other factor is people of low socioeconomic level have difficulties in getting health care facilities from the eye care provider.¹⁴

This study concludes that frequency of visual impairment and eye-glasses-used students at Cibeusi Elementary School is considerably different. There are some limitations in this study. E-chart used as a tool in screening of visual impairment does not give information about the visual acuity. This screening program provides information whether the students has visual impairment or not. Data were obtained during school time so that the number of students involved in this study was limited. There is no analysis about factors affecting visual impairment in aged 8-10 years.

The frequency of visual impairment was not similar with the frequency of eye-glasses-used in this study, so there should be an approach not only to the Health and education department but also to both teachers and parents to make visual screening as a school program to support Vision 2020 of WHO. It

may also decrease the number of avoidable blindness in early age. Education is important to increase the awareness of teachers and parents that visual impairment can affect learning, communication, productivity, and quality of life. Next study should be conducted to analyze whether there is an association of student's characteristics and visual impairment or not, and factors affecting visual impairment.

References

1. World Health Organization. Global initiative for the elimination of avoidable blindness: action plan 2006-2011. Geneva: World Health Organization. 2007:1-25.
2. Kementerian Kesehatan Republik Indonesia. Pokok-Pokok Hasil Riskesdas 2013. Jakarta: Kemenkes RI. 2013: 270-7.
3. Opubiri I, Pedro-Egbe C. Screening for refractive error among primary school children in Bayelsa state, Nigeria. *Pan Afr Med J*. 2013;14(1):74.
4. Pi L-H, Chen L, Liu Q, Ke N, Fang J, Zhang S, et al. Prevalence of eye diseases and causes of visual impairment in school-aged children in Western China. *J Epidemiol*. 2011;22(1):37-44.
5. Smith T, Frick K, Holden B, Fricke T, Naidoo K. Potential lost productivity resulting from the global burden of uncorrected refractive error. *Bull World Health Organ*. 2009;87(6):431-7.
6. Padhye AS, Khandekar R, Dharmadhikari S, Dole K, Gogate P, Deshpande M. Prevalence of uncorrected refractive error and other eye problems among urban and rural school children. *Middle East Afr J Ophthalmol*. 2009;16(2):69-74.
7. Harley RD, Nelson LB, Olitsky SE. *Harley's pediatric ophthalmology*. Philadelphia: Lippincott Williams & Wilkins; 2005.
8. Teerawattananon K, Myint C-Y, Wongkittirux K, Teerawattananon Y, Chinkulkitnivat B, Orprayoon S, et al. Assessing the accuracy and feasibility of a refractive error screening program conducted by school teachers in pre-primary and primary schools in Thailand. *PloS one*. 2014;9(6):1-8.
9. Sewunet SA, Aredo KK, Gedefew M. Uncorrected refractive error and associated factors among primary school children in Debre Markos District, Northwest Ethiopia. *BMC Ophthalmol*. 2014;14(1):95.
10. Al Wadaani FA, Amin TT, Ali A, Khan

- AR. Prevalence and pattern of refractive errors among primary school children in Al Hassa, Saudi Arabia. *Glob J Health Sci.* 2012;5(1):125-34.
11. Aldebasi YH. Prevalence of correctable visual impairment in primary school children in Qassim Province, Saudi Arabia. *J Optom.* 2014;7(3):168-76.
 12. Ghosh S, Mukhopadhyay U, Maji D, Bhaduri G. Visual impairment in urban school children of low-income families in Kolkata, India. *Indian J Public Health.* 2012;56(2):163-7.
 13. Aldebasi YH. A descriptive study on compliance of spectacle-wear in children of primary schools at Qassim Province, Saudi Arabia. *Int J Health Sci (Qassim).* 2013;7(3):291-9.
 14. McClure TM, Choi D, Wooten K, Nield C, Becker TM, Mansberger SL. The impact of eyeglasses on vision-related quality of life in American Indian/Alaska Natives. *Am J Ophthalmol.* 2011;151(1):175-82.

Characteristics of Maxillofacial Fractures Resulting from Road Traffic Accidents at Dr. Hasan Sadikin General Hospital

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Abstract

Background: Maxillofacial fracture is a serious injury in the head region which is frequently found in the emergency room. In Indonesia, the road traffic accident is the main etiology. Epidemiological assessments are important to assess trends and set the priorities for treatment and prevention of the injury. This study was conducted to identify the characteristics of maxillofacial fracture resulting from road traffic accidents.

Methods: This descriptive retrospective study involved hospitalized patients with maxillofacial fracture resulting from road traffic accidents at Dr. Hasan Sadikin General Hospital in 2011–2013 using the total sampling technique. Data were collected in the period August–October 2014 which included patient demographics, detailed description of the accident and the fracture.

Results: A total of 187 patients with male/female ratio of 5:1 and a mean age of 26.78 year. The majority of patients were motorcyclists (92%) with most of them were not wearing safety equipment. Most of the accidents took place in 2011 in Bandung. Mandible was the most common site of injury followed by the maxilla and nasal bone. Open reduction was performed in 69.52% patients).

Conclusions: Maxillofacial fracture is more common in men with the mean age of 26.78 years. The majority of patients are motorcyclists. Most of them are not using safety equipment. Most of the accidents occurred in Bandung in 2011. Mandible is the most common site of fracture. Open reduction is the most commonly performed treatment.

Keywords: Head injury, maxillofacial fracture, road traffic accident

Introduction

Maxillofacial fracture is a serious injury in the head region which is frequently found in the emergency room.¹ The maxillofacial region is more vulnerable to fractures because it is the most exposed part of the body.¹ Besides Maxillofacial fracture still becomes a serious clinical problem because of its specific anatomical area, where the important organs such as respiratory, neurologic, and digestive system are located.² A study in Uganda² stated that 20% of maxillofacial fracture patients have cranio-cerebral injury. It also can affect the patient's quality of life, such as the psychological and esthetical aspect.² The etiology of maxillofacial fractures are road traffic accident, assault, fall, sport injury,

domestic violence, and other.^{1,3,4} In developing countries, road traffic accident is still the main etiologic factor of maxillofacial fractures. In Indonesia⁵ especially West Java, 84.2% cases of maxillofacial fracture are caused by road traffic accidents.

A road traffic accident is caused by many factors. Human factor is one of the main reasons for traffic accidents. Driving while sleepy, fatigue, at inappropriate speed, or without using protective gears (such as helmet and safety belts) and poor compliance to traffic laws are examples of human factors contributing to road traffic accidents. The development of roads and other transport infrastructures which did not keep up with the rapid pace of increase in the number of vehicles also contributes to road traffic accidents.⁶

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Epidemiological assessments are important to assess trends and set the priorities of treatment protocols and prevention programs against the injury.⁷ The aim of this study was to identify the frequency and characteristics of patients with maxillofacial fractures resulting from road traffic accidents at Dr. Hasan Sadikin General Hospital.

Methods

Population of the study were patients with maxillofacial fractures resulting from road traffic accidents at Dr. Hasan Sadikin General Hospital. The subjects of the study were hospitalized patients with maxillofacial fractures resulting from road traffic accidents at Dr. Hasan Sadikin General Hospital in the period 2011–2013. The inclusion criteria were hospitalized patients with maxillofacial fractures resulting from road traffic accidents at Dr. Hasan Sadikin General Hospital in the period 2011–2013. This study excluded patients whose detailed data were not completed in the medical record such as identity, type of fracture and the treatment. This study used total sampling as data collection method.

This descriptive retrospective study was using the cross-sectional method. This study was conducted by using data in medical records of hospitalized patients with maxillofacial fractures resulting from road traffic accidents treated in Otorhinolaryngology-Head and Neck Surgery Department, Oral and Maxillofacial Surgery Department, Plastic Surgery Department and Neurosurgery Department at Dr. Hasan Sadikin General Hospital in the period 2011–2013. Data were collected between August and October 2014. This study was approved by the Health Research Ethics Committee Faculty of Medicine Universitas Padjadjaran and Dr. Hasan Sadikin General Hospital, Bandung.

The collected data included patient's identification and demographic features, detailed description of the accident (time and location of accident, role of patient in vehicle, the vehicle and safety equipment used), detailed description of the injury (type of fracture, treatment of the fracture and location of concomitant injury).

Information of patient identification and demographic features were obtained from the identity form of the patient's medical record. Detailed data descriptions of the accident were obtained from the anamnesis written in the medical record. While data regarding

the detailed description of the injury (type of fracture and location of concomitant injury) were obtained from the anamnesis, physical examination, and supportive examination written in the medical record. Data concerning the treatment of the patient were collected from the information written in the medical record.

The etiology of maxillofacial fractures was grouped into road traffic accidents and other causes. The time of accidents were grouped into year 2011, 2012 and 2013. The locations of accidents were grouped into Bandung and outside Bandung region. Bandung region included Bandung city, Kabupaten Bandung and Kabupaten Bandung Barat (Regencies), other than that was outside Bandung region. The type of vehicles used by patients were grouped into pedicab, bus, car, bicycle, motorcycle, and truck. Patients who did not have a description about the location of accident and type of vehicle were included into the no-details group. The roles of patient who used vehicles were grouped into driver and passenger. The safety equipments used by the patient at the time of accident were classified into using the safety equipment, were not using the safety equipment and have no-details group.

The injuries which patients suffered were grouped into maxillary fracture, mandible fracture, nasal fracture, orbital fracture, frontal sinus fracture, zygoma fracture, and multiple maxillofacial fractures. The mandibular fractures were grouped by their anatomical location into angular, condyle, coronoid, corpus, parasymphysis, ramus, symphysis, and subcondyle. The maxilla fractures were grouped into unilateral fracture and Le Fort classification. In addition patients having a combination of more than one type of isolated maxillofacial fractures were grouped into multiple maxillofacial fractures. The treatment of fractures were classified into open reduction, closed reduction, conservation, and refused treatment.

All data obtained were input using the Microsoft Excel 2007 program. The data analysis was conducted using descriptive statistics, while statistical software was used for statistical analysis.

Results

The total data obtained in this study was 368, but only 211 cases with maxillofacial fractures were treated at Dr. Hasan Sadikin General Hospital Bandung, in the period January 2011

Table 1 Demographic Characteristics of Maxillofacial Fracture

Characteristics	Frequency	Percentage (%)
Etiology	211	
Road Traffic Accident	187	88.63
Other	24	11.37
Sex	187	
Male	156	83.4
Female	31	16.6
Age		
Mean+SD = 26.78+11.64years		
Median = 24 years		
Mode = 17 years		
Range = 5-70 years		
Time of accident	187	
2011	88	47.1
2012	55	29.4
2013	44	23.5
Location of accident	187	
Bandung region	110	58.8
Outside Bandung region	72	38.5
No details	5	2.7
Type of vehicle used	187	
Pedicab	0	0
Bus	2	1.1
Car	5	2.7
Bicycle	1	0.5
Motorcycle	172	92
Pedestrian	6	3.2
Truck	0	0
No details	1	0.5
Role of Patient	180	
Driver	158	92.94
Bicycle	1	
Bus	0	
Car	4	
Motorcycle	153	
Passenger	22	7.06
Bicycle	0	
Bus	2	
Car	1	
Motorcycle	19	

Table 2 Distribution of the Type of Vehicle and the Safety Equipment Used

Type of vehicle	Safety Equipment Used						Total
	Using		Not Using		No details		
	f	%	f	%	f	%	
Car	0	0	4	80	1	20	5
Motorcycle	84	48.8	81	47.1	7	4.1	172
Total	84	47.5	85	48	8	4.5	177

to December 2013. Out of the 211 cases, only 187 cases (88.63%) met the inclusion criteria and 24 cases (11.37%) resulted from other causes such as interpersonal violence, sport injury, work injury, falls, etc. There were 156 (83.4%) males and 31 (16.6%) females, causing a male to female ratio of approximately 5:1 and an age range from 5–70 years (mean = 26.78 years; SD = 11.64 years) (Table 1).

The distribution of patients with maxillofacial fractures resulting from traffic accidents according to the time of accident

revealed that most accidents occurred in 2011 (88 patients, 47.1%) and least in 2013 (44 patients, 23.5%). The distribution according to the location of the accidents revealed that most accidents occurred in Bandung region (110 patients, 58.8%).

Based on the statistics of patients with the type of vehicle used showed most of the patients were using a motorcycle at the time of the traffic accident, causing maxillofacial fractures (172 patients, 92%). While other patients were using car, bus, bicycle, or were

Table 3 Types of Maxillofacial Fracture

Type of Fracture	Frequency	Percentage (%)
Maxillary	21	11.2
Unilateral	7	33.3
Le Fort I	5	23.8
Le Fort II	7	33.3
Le Fort III	2	9.5
Mandibular*	89	47.6
Angular	20	16.95
Condyle	11	9.32
Coronoid	1	0.85
Corpus	17	14.41
Parasymphysis	48	40.68
Ramus	2	1.7
Symphysis	15	12.71
Subcondyle	4	3.39
Nasal Bone	15	8
Orbital	4	2.1
Frontal Sinus	4	2.1
Zygoma	8	4.3
Multiple Fracture	46	24.6
Total	187	100

Note: * More than one type can be present for each patient

Table 4 Distribution of Multiple Maxillofacial Fractures

Type of Fracture*	Frequency
Maxillary	24
Unilateral	11
Le Fort I	3
Le Fort II	9
Le Fort III	6
Mandibular	25
Angular	1
Condyle	4
Coronoid	0
Corpus	3
Parasymphysis	13
Ramus	1
Symphysis	6
Subcondyle	1
Nasal Bone	20
Orbital	16
Frontal	12
Zygoma	20

Note: * More than one type can be present for each patient

pedestrians.

Furthermore, the statistics of patients with reference to their role in using a vehicle revealed that the majority of patients were motorcycle drivers (153 patients), followed by motorcycle passengers (19 patients), and car drivers (4 patients) (Table 1).

The distribution of type of vehicle according to the safety equipment used by maxillofacial fracture patients revealed, most of the patients who used a motorcycle at the time of accident were not wearing safety equipment (85 patients, 48%). There were no data available in the patient's medical record regarding the safety equipment worn by patients who were using a bicycle and bus (Table 2).

The distribution of patients with maxillofacial fracture resulting from road traffic accidents according to the type of fracture showed that the multiple maxillofacial fracture is the combination of more than one type of isolated maxillofacial fractures. The most common site of fractures were mandible (89 patients-47.6%), maxilla (21 patients-11.2%), and nasal (15 patients-8%) (Table 3).

The distribution of the type of maxillofacial

fracture in multiple maxillofacial fracture patients revealed that the common sites of fractures were mandible, maxilla, nasal and zygoma (Table 4).

The statistics of patients in relation to the treatment of maxillofacial fractures showed that open reduction was performed in 69.52% of patients, while 10.6% of patients had close reduction (Table 5).

Discussion

In this study, road traffic accident was the main etiology of maxillofacial fractures compared to other factors. This result was in accordance with the study conducted by Adeyemo et al.¹ in Nigeria and Leles et al.⁷ in Brazil which showed most patients with maxillofacial fractures resulted from road traffic accidents, however it was inconsistent with a similar study conducted by Pham-Dang et al.⁴ in France that showed interpersonal violence as the main cause of maxillofacial fracture. The study conducted in Azerbaijan⁸ stated that the road traffic accident is still the main reason for maxillofacial fractures, due to the rapid increase in the number and type of vehicle and

Table 5 Distribution of Treatment of Fractures

Characteristics	Frequency	Percentage (%)
Concomitant Injury	187	
Upper Extremity Injury	4	2.1
Lower Extremity Injury	6	3.2
Ocular Injury	1	0.5
Mild Head Injury	59	31.6
Moderate Head Injury	7	3.7
Severe Head Injury	0	0
Thorax Injury	3	1.6
Abdominal Injury	0	0
Multiple Injury	7	3.7
Without Injury	100	53.5
Treatment of Fracture	187	
Open Reduction	130	69.52
Close Reduction	20	10.7
Conservative	7	3.74
Refuse Treatment	30	16.04

along with poor driver's compliance with the traffic law.

This study exhibited that most of the patients were males. More males were involved in maxillofacial fractures than females which were in accordance with other previous international studies.^{3,7,9,10} The predominance of male patients could be due to the fact that males are the breadwinner of the family and mostly work outdoors, consequently have a high risk to road traffic accidents. Even though in past decades, there is an increase in the prevalence of female patients especially of those aged below 40 years due to changes in their social behavior, for example their participation in non-domestic work. Cultural and socioeconomic factors of certain regions determine the prevalence of male to female ratio of maxillofacial fracture patients.⁷ In countries where women are extensively active in social activities such as in Brazil⁷, the male to female ratio is 3:1. On the other hand, in the United Arab Emirates¹⁰ the male to female ratio is 7:1, due to the fact that mostly men are working outdoors and few women are driving vehicles.

The mean age of the subjects in this study was 26.78 year with most cases below the age of 24 years. These results are consistent with the study conducted by Leles et al.⁷ in the Brazil which showed that 32.3% of the

patients are in the age group of 21–30 years. Other international studies also had similar results with this study. This was possibly due to their behavioral changes into independent individuals, high mobility, careless driving on the roads and economically active segment of society. On the other hand, in this age group, their compliance to the traffic law is poor and their inexperience in driving.^{1,2,7,9-11}

The frequency of maxillofacial fracture resulting from road traffic accidents in this study steadily decreased from year to year. Whilst a study conducted in Kenya¹¹ had similar results. There is a decrease in the number of maxillofacial trauma resulting from road traffic accidents in 2004 compared to 2003. It might be due to an increase of awareness among the road users about the importance of compliance to the traffic law including wearing safety equipment while driving.

According to the location of the traffic accident, more traffic accidents occurred in Bandung region than outside Bandung region. Nevertheless, there was no other study concerning the location of road traffic accidents which caused maxillofacial fractures in West Java.

Our results demonstrated that the maxillofacial fractures resulting from traffic accidents were most common in the group of patients who were using motorcycle as their

vehicle when the accident occurred. Based on the role of the patients with vehicles, most of the subjects were motorcycle drivers followed by motorcycle passengers and next, car drivers. It is in accordance with the study conducted by Leles et al.⁷ in Brazil which showed 41.32% of patients are motorcyclist. It can be explained by the fact that in Indonesia, the prevalent number of people is using a motorcycle as means of transport. It was proven by data from Statistic Indonesia (Badan Pusat Statistik, BPS) that showed in 2012 motorcycle is the most common used vehicle in Indonesia.¹³ It occupied 80.95% of all vehicle transport in Indonesia; however, this result was different with the study conducted by Akama et al.¹¹ in Kenya that showed most of the subjects are 72.5% pedestrians.

Furthermore, most of the maxillofacial fracture patients in this study were not wearing safety equipment such as safety belts and helmets. However the number was not significantly different with the subjects who were wearing safety equipment, indicating that the compliance of road users for wearing safety equipment was still low. This study result is lower than another study result in Malaysia¹², which reported 60% of motorcyclist are wearing helmets. However, it is higher than in the study conducted by Oginni et al.¹⁴ which showed only 3% patients are wearing helmets.

The application of safety equipment by the vehicle users was important. Data showed that there was a significant decrease in the occurrence of road traffic accidents in developed countries after the enforcement of the traffic law. The best protection against injuries as indicated by vehicle accident statistics includes safety awareness and a personal commitment to ride safely all the time. Another study showed that the usage of safety belts can reduce 42% of fatalities, while the motorcyclist who are not wearing helmets are five times more likely to have severe head injury.^{7,11}

In this study, mandible fracture was the most common type of maxillofacial fracture. This agrees with the result of a study from Al Khateeb¹⁰ in United Arab Emirates (UAE). The locations of mandible fractures in this study were more common in the parasymphysis and corpus region. The study conducted by Leles et al.⁷ in Brazil revealed that the most common affected region was condyle of the mandible. The tendency is due to the prominence of mandible and is the only movable bone in the maxillofacial region.⁹ Whilst a different study revealed that the most affected region

of maxillofacial fractures are nasal and zygomatic-orbital complex.⁷

This study showed that more patients received open reduction as their fracture treatment than others, which was also reported elsewhere.⁴ Contrary, this study results was different with the study conducted by Adriane² in Uganda which showed that most of the fracture patients are performed by closed reduction. In Uganda², it is due to the cost of open reduction and the scarce of plates and theater space to perform the procedure.

This study concluded that maxillofacial fractures resulting from road traffic accidents are more common in male than in female patients. The mean age of the patient is 26.78 years. The highest prevalence of fracture occurs in the Bandung region, in 2011. The majority of patients are motorcycle drivers, followed by motorcycle passengers, pedestrians, car drivers, and car passengers, respectively and most of them are not wearing protective equipment. The frequent type of maxillofacial fracture resulting from road traffic accidents includes mandibular fracture, maxillary fracture, and nasal bone fracture. Open reductions are more frequently performed than close reductions or conservative methods.

The limitations of study are mainly caused by the high number of incomplete data on the patient medical records regarding to the variable seek in this study. Improvements of the medical record system including the registry and storage system are highly recommended.

References

1. Adeyemo WL, Ladeinde AL, Ogunlewe MO, James O. Trends and characteristics of oral and maxillofacial injuries in Nigeria: a review of the literature. *Head Face Med.* 2005;1:7.
2. Kamulegeya A, Lakor F, Kabenge K. Oral maxillofacial fractures seen at a Ugandan tertiary hospital: a six-month prospective study. *Clinics (Sao Paulo, Brazil).* 2009;64(9):843-8.
3. Alves LS, Aragao I, Sousa MJ, Gomes E. Pattern of maxillofacial fractures in severe multiple trauma patients: a 7-year prospective study. *Braz Dent J.* 2014;25(6):561-4.
4. Pham-Dang N, Barthelemy I, Orliaguet T, Artola A, Mondie JM, Dallel R. Etiology, distribution, treatment modalities and complications of maxillofacial fractures. *Med Oral Patol Oral Cir Bucal.* 2014;19(3):e261-9.

5. Daniel Angel Laura, Syamsudin Endang, Fathurrahman. Characteristics of maxillofacial fractures in Hasan Sadikin Hospital within Period 2009–2011. Proceeding of the International Symposium on Oral and Dental Sciences; 2012 March 1–3; Yogyakarta. Yogyakarta: Faculty of Dentistry Universitas Gajah Mada; 2013.
6. Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, et al., editors. World report on road traffic injury prevention. Geneva: World Health Organization; 2004.
7. Leles JL, dos Santos EJ, Jorge FD, da Silva ET, Leles CR. Risk factors for maxillofacial injuries in a Brazilian emergency hospital sample. *J Appl Oral Sci.* 2010;18(1):23–9.
8. Hasanova GF. Maxillofacial injuries resulting from road traffic accidents. *Ліки України.* 2014;2(178):22–3.
9. Maliska MCd, Marcia B, Luciana A, de Moraes M, Moreira RWF. Oral and maxillofacial surgery-Helmet and maxillofacial trauma: a 10-year retrospective study. *Braz J Oral Sci.* 2012;11(2):125–9.
10. Al-Khateeb T, Abdullah FM. Craniomaxillofacial injuries in the United Arab Emirates: a retrospective study. *J Oral Maxillofac Surg.* 2007;65(6):1094–101.
11. Akama MK, Chindia ML, Macigo FG, Guthua SW. Pattern of maxillofacial and associated injuries in road traffic accidents. *East Afr Med J.* 2007;84(6):287–95.
12. Ramli R, Abdul Rahman R, Abdul Rahman N, Abdul Karim F, Krsna Rajandram R, Mohamad MS, et al. Pattern of maxillofacial injuries in motorcyclists in Malaysia. *J Craniofac Surg.* 2008;19(2):316–21.
13. Badan Pusat Statistik Indonesia. Produksi kendaraan bermotor dalam negeri (unit), 2008-2013. Jakarta: Badan Pusat Statistik Indonesia; 2015.
14. Oginni FO, Ajike SO, Obuekwe ON, Fasola O. A prospective multicenter study of injury profile, severity and risk factors in 221 motorcycle-injured Nigerian maxillofacial patients. *Traffic Inj Prev.* 2009;10(1):70–5.

Correlation between Short-Term Memory and Achievement of Athletes

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Abstract

Background: Human activity is largely related to thought processing or cognition. One of the most important components of cognition is memory. Individuals who undergo heavy activities, such as athletes, use a lot of memory in the subject's activities, especially during competitions. The purpose of this study was to find out whether there was a correlation between the capability of short term memory with the performance of an athlete during a competition, especially those measured by achievements.

Methods: This study was an analytic observational correlation study with a cross-sectional design and involved 201 athletes as respondents from 12 branches of sports. The study was conducted in the Indonesian National Sports Committee (KONI) building from September to November 2015. Digit Span Forward and Backward were used to collect short term memory data and was performed after a consent form and the respondent's identity was recorded. The athlete's achievements data was gathered by an interview and recapitulation of athlete's achievements in the last five years.

Results: OA total of 186 data was analyzed and found a negative and insignificant correlation between achievement and short-term memory based on digit span tests both forward ($r=0.095$ $p=0.196$) and backward ($r=0.039$ $p=0.196$).

Conclusions: There is no correlation between short term memory and the achievements of an athlete.

Keywords: Achievement, athlete, short term memory

Introduction

The mind's ability is the competence for thinking and processing thought from all sources. The received information will be processed and attained systematically in the human mind. The capability of thought arrangement is called cognition.¹ A study by Bull et al.², shows that there is a relationship between the cognitive ability and achievements in grade 4 students in an elementary school in USA, especially in reading and mathematics. This proves the importance of cognition especially in an individual's life performance, one of them being achievements.² The most important part in information processing is memory. After processing, the information will be stored in the brain for future reuse in many daily activities. There are three types of memory which is differentiated by the length of time in the memory storage named long-term, intermediate and short-term memory.³ Short term memory has a storage capacity

of about seven items for 20-30 seconds.⁴ Short term memory is needed in the recalling of information that originated from long term memory, the selection of information, repetition of information that are received and stored, and also as a choosing response, which plays a vital role in all the individual activities. A study by Swanson⁵ proves that the short term verbal memory has a relationship with achievements especially in language studies and mathematics in children and adults.

Furthermore, Short term memory is also needed in a special community, such as athletes. A few studies have proven that routine exercises could increase the cognitive function including memory.^{6,7} Athletes undergo routine exercises to improve the performance on the field during a competition and to maintain good physique. An athlete's sports performance on the field consists of the athlete's capability and achievement, the characteristics of their performance in a competition, a fair behavior, integrity, and an appreciation for friend or foe.⁸

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Short-term memory plays a role in an athlete's performance, for example, an athlete is required to remember strategic tactics instructed by the coach either before or during a break in competitions to maximize the athlete's performance. The performance of an athlete can be clearly seen and measured through the achievements, namely the medals. To our knowledge, there is not a study that shows a correlation between short term memory and an athlete's achievements. This study aimed to discover and analyse the correlation between short term memory and the athlete's achievements.

Methods

A cross-sectional analytic study was conducted from September to November 2015 in the Indonesian National Sports Committee (*Komite Olahraga Nasional Indonesia, KONI*) West Java building, and approved by the Health and Research Ethics Committee, Faculty of Medicine, Universitas Padjadjaran. The subjects for this study were 201 athletes of West Java KONI from 12 branches of sports comprising pencak silat, judo, athletics, archery, fencing, taekwondo, rock climbing, boxing, heavy lifting, gymnastics, wrestling

and kempo. The sample collection in this study was obtained used the total sampling method and the correlative analysis sample size formula with α 5%, β 10%, and R 0,7 from previous studies, and turned out to be 14.5. The inclusion criteria were athletes who were willing to participate in the study, had filled out an informed consent form, and completed 90–100% of their training program. Short term memory was assessed by using the digit span forward and backward instrument that was part of the Wechsler Adult Intelligence Scale (WAIS) IV and Wechsler Intelligence Scale for Children (WISC) IV cognition test which was validated.⁹⁻¹² Additionally, training before handling, suitability test for intra-observers and inter-observers, and athlete identification was conducted before data collection.

Digit Span Forward Test was performed by requesting the athlete to repeat a sequence of numbers stated by an examiner. A score of 2 was given if the athlete repeated the sequence correctly, while a score of 0 was given if the sequence could not be repeated accurately. The questionnaire with two wrong answers was considered finish, and the athlete's score was written on an evaluation form.

Digit Span Backward test was then carried out, where an athlete repeated the numbers stated by an examiner but in a backwards

Table 1 Characteristics of Participants

Variables	Frequency	Percentage (%)
Sex		
Male	91	49
Female	95	51
Sport		
Pencak Silat	23	12
Judo	21	11
Athletics	12	6
Archery	14	8
Fencing	15	8
Taekwondo	14	8
Rock Climbing	20	11
Boxing	6	3
PABBSI	12	6
Gymnastics	15	8
Wrestling	4	2
Kempo	30	16

Table 2 Measurement of Study Data Dispersion

	Median	Minimum	Maximum
Score			
Achievement	3	1	16
Digit Span Forward	10	6	16
Digit Span Backward	6	4	16

sequence. A score of 2 was given if the athlete repeated the backwards sequence correctly, while a score of 0 was given if the backwards sequence could not be repeated accurately. The questionnaire with two wrong answers was considered finish, and the athlete’s score was written on an evaluation form.

The achievement data was about the latest medals attained by the athletes from previous competitions, and information was obtained from interviews with the athletes. The medals might be gold, silver or bronze that the athlete received in state, national or international events.

The data was analyzed using statistical application. The normality test was performed using the Kolmogorov-Smirnov test. The normality results were used to determine the type of correlation test that would be conducted.

Results

Out of 201 athletes included in the study, 186 eligible athletes were recruited, and 15 were excluded as they had not completed the tests. According to the branch of sports, the highest frequency of respondents was from the Kempo branch (16.1%) and was dominated by female athletes (51.1%) (Table 1).

The results showed that either the independent or dependent variables presented a data distribution which was not normal. Thus, to display the statistics of this study in a descriptive way, a median was used as a measurement of central tendency and a minimum maximum as a measurement of

dispersion (Table 2).

Moreover, results of the Spearman’s test showed an insignificant negative correlation between Digit Span Forward and achievements, as well as between Digit Span Backward and achievements (Table 3).

Discussions

The Spearman correlation test showed that there was a negative and insignificant correlation between the short term memory and the athlete’s achievements. Additionally, a study by CDC¹³ showed that physical activities could influence the cognitive ability of someone by an increase in the growth of brain capillaries, oxygenation, blood pressure, neurotrophin production, number of neurotransmitters, growth of nerve cells in the hippocampus, development of nerve connections, volume of brain tissue and density of interneuron relationships. This causes an increase in the functionality of attention, information processing, information storage and repetition; it also increases coping mechanism, heightens positive behavior and reduces the sensation of pain. This study also showed that there was an influence of physical activity to academic performance. Aerobic exercises in the form of group games, especially those that needed complex motoric activities (example; football), could increase prefrontal cortex activities, and increased the positive marginal effect in mathematical achievements.

Furthermore, Sun et al.¹⁴ stated that the brain’s functional magnetic resonance

Table 3 Correlation Analysis Test Result

		Digit Span Forward	Digit Span Backward
Achievement	Spearman Correlation	-0.095	-0.039
	P-value (2-tailed)	0.196	0.594
	N	186	186

imaging (fMRI) test results on the prefrontal cortex activity especially in the Dorsal Lateral Prefrontal Cortex has a major role in the short term memory function. Short term memory has a correlation with achievements in language studies and mathematics in children and adults.⁵ This shows that short term memory influences an individual's achievement. There are a few factors that influence the memory function of an individual, one of it is concentration. Duration, intensity and time of stress as intrinsic factors could also influence memory.¹⁵ Stress will activate the Hypothalamic-pituitary-adrenal (HPA) Axis and increase the rate of glucocorticoid, cortisol in humans. The increase of the glucocorticoid rate could decrease memory function.^{15,16}

Athletes are people who experience a lot of physical activities with specific training regimes. The main purpose of an athlete is to win competitions and to garner achievements in the form of medals.¹⁷ Sports performance of athletes are influenced by cognitive function, stress factor, confession of physical or mental mistakes on the field, frequent endurance of pain and unease on the field, seeing successful or cheating rivals on the field, getting a violation from the referee, and being reprimanded by the coach. The failure of the coping mechanism with acute stress levels could lead to change in the psycho-behavioral processes of the athlete.¹⁸

This study was not focused on the measurement of short term memory quality as an effect of an athlete's physical activity. This study was focused on the short term memory and the achievement of athletes due to a relationship between athletes who endure loads of exercise and the increase of cognitive function, especially the short term memory.

In conclusion, there is no correlation between the West Java KONI athlete's short term memory capability and their achievements, and this may occur due to a few factors that in turn influenced the athlete's performance on the field aside from the short term memory. There are also factors that influenced short term memory when the test is conducted, such as concentration.

This study has several limitations. The researcher did not measure the stress factor and the concentration that may influence the athlete's achievements in competitions and memory function during data collection. This is due to the insufficient study time.

Recommendations for athletes are to maintain factors that can influence the athlete's performance on the field. One of them is the role

of KONI to measure also the cognitive function and stress factor of the athletes regularly before a match. Recommendations for a future study are to conduct carry out a study with cohort method by measuring the short term memory of the athletes before a competition and to observe the development of the athlete's performance. Further recommendations are to measure and to control positive factors that may influence the short term memory or an individual's performance. Additionally, to evaluate the part of the brain that activates the short term memory directly during the study by using fMRI.

References

1. Singh M, Narang M. Cognitive enhancement techniques. *Int J Inf Technol Knowl Manag.* 2014;7(2):49-61.
2. Bull R, Espy KA, Wiebe SA. Short-term memory, working memory, and executive functioning in preschoolers: longitudinal predictors of mathematical achievement at age 7 years. *Dev Neuropsychol.* 2008;33(3):205-28.
3. Guyton A, John EH. Thoughts, consciousness, and memory. In: Schmitt W, Rebecca G, Folcher MA, editors. *Textbook of medical physiology.* 11st ed. Philadelphia, PA : Saunders/Elsevier; 2011. p. 723-6.
4. Cowan N. What are the differences between long-term, short-term, and working memory? *Prog Brain Res.* 2008;169(1):323-38.
5. Swanson HL. Short-term memory and working memory: do both contribute to our understanding of academic achievement in children and adults with learning disabilities? *J Learn Disabil.* 1994;27(1):34-50.
6. Nanda B, Balde J, Manjunatha S. The acute effects of a single bout of moderate-intensity aerobic exercise on cognitive functions in healthy adult males. *J Clin Diagn Res.* 2013;7(9):1883-5.
7. Mayers LB, Redick TS, Chiffrieller SH, Simone AN, Terraforte KR. Working memory capacity among collegiate student athletes: effects of sport-related head contacts, concussions, and working memory demands. *J Clin Exp Neuropsychol.* 2011;33(5):532-7.
8. Arai A, Ko YJ, Ross S. Branding athletes: exploration and conceptualization of athlete brand image. *Sport Manag Rev.* 2014;17(2):97-106.
9. Drozdick LW, Cullum CM, Antonio S.

- Expanding the ecological validity of WAIS-IV and WMS-IV with the Texas Functional Living Scale. HHS Public Access. 2015;18(2):141-55.
10. Holdnack J, Zhou X, Larrabee G, Millis S, Salthouse T. Confirmatory factor analysis of the WAIS-IV/WMS-IV. NIH Public Access. 2013;18(2):178-91.
 11. Mcfarland DJ. Modeling individual subtests of the WAIS IV with multiple latent factors. PLoS One. 2013;8(9):1-7.
 12. Kaufman A. Test review: wechsler intelligence scale for children, fourth edition (WISC-IV). J Psychoeduc Assess. 2006;24(3):278-95.
 13. CDC. The association between school-based physical activity, including physical education, and academic performance. 2010;2(1):1-84.
 14. Sun X, Zhang X, Chen X, Zhang P, Bao M, Zhang D, et al. Age-dependent brain activation during forward and backward digit recall revealed by fMRI. Neuroimage. 2005;26(1):36-47.
 15. Sandi C, Pinelo-Nava MT. Stress and memory: behavioral effects and neurobiological mechanisms. Neural Plast. 2007;1(3):1-20.
 16. Sandi C. Glucocorticoids act on glutamatergic pathways to affect memory processes. Trends Neurosci. 2011;34(4):165-76.
 17. Yarrow K, Brown P, Krakauer JW. Inside the brain of an elite athlete: the neural processes that support high achievement in sports. Nat Rev Neurosci. 2009;10(8):585-96.
 18. Bahramizade H, Besharat MA. The impact of styles of coping with stress on sport achievement. Procedia-Social Behav Sci. 2010;5(2):764-9.

Early Detection of Suspected Systemic Lupus Erythematosus in Community-Dwellings in West Java Indonesia

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Abstract

Background: Prevalence of systemic lupus erythematosus (SLE) has been known in almost all countries around the world. Contrary to this, in Indonesia, neither a national epidemiologic study on SLE nor any direct study on SLE in the general population has been conducted. Early detection of SLE is needed as a first step to determine prevalence of SLE in Indonesia as well as to prevent further complications. This study aimed to obtain the prevalence of suspected SLE in community-dwellings.

Methods: This study was conducted in the period September to November 2015 and used the descriptive cross-sectional method. The respondents were people who were at least 18 years old and lived in selected blocks in three different villages in Jatinangor, West Java. Data were obtained from secondary sources of a previous SLE screening study that was incorporated in a study on "Epidemiology of hypertension and albuminuria in Jatinangor" in 2014, using the multistage sampling method. Suspected SLE was based on the Liang screening questionnaire. The collected data were presented in tables.

Results: There were 72 respondents (8%) suspected to have SLE. Most of the cases were female (Odds ratio:1.47) and 51–60 years old. The most clinical manifestation was painful swollen joints >3 months.

Conclusions: The existence of suspected SLE cases in Jatinangor's population, as an example of Indonesian population should be a concern so that examinations could be carried out to make sure that respondents with SLE can be provided prompt interventions to prevent further complications.

Keywords: Early detection, *liang* screening questionnaire, systemic lupus erythematosus

Introduction

Systemic lupus erythematosus (SLE) is a chronic multisystem autoimmune disease with broad clinical features, ranged from minor skin manifestation to serious organ damage.¹ Due to the SLE chronic features, the financial burden of SLE is expected to increase.²⁻⁴ The annual healthcare cost in Asia for SLE patients without nephritis is estimated to reach US\$16,638 per patient/year.⁴

The prevalence of SLE in Asia-Pacific countries varies between 4.3–45.3 per 100,000 population per year.¹ On the other hand, in Indonesia, neither an epidemiologic study on SLE nor any direct study on SLE in the general population has been conducted. The only available data are mostly obtained from local health care centers.

For those two reasons, SLE screening

is needed as a first step to determine the prevalence of SLE in Indonesia. Systemic lupus erythematosus screening is one of the efforts which allows early detection of lupus; hence, immediate intervention of suspected SLE patients can be given, so that they will have a better life.

A previous multidisciplinary study has been conducted in Jatinangor, West Java, Indonesia to survey the health of communities in Jatinangor, including performing SLE screening. However, the previous SLE screening study has not been published yet. By using data of the mentioned study, this study aimed to obtain the number of people with suspected SLE in Jatinangor.

Methods

This study used secondary sources obtained from a previous SLE screening study

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entitled “Epidemiology of hypertension and albuminuria in Jatinangor” which has been conducted since 2014. This study utilized the previous data using the descriptive-observational method with a cross-sectional approach and was conducted in the period September to November 2015. This study was approved by the Health Research Ethics Committee, Faculty of Medicine, Universitas Padjadjaran.

The respondents of both the previous and this current study were the population of Jatinangor who lived in three different villages namely, Cipacing, Hegarmanah and Cilayung. The previous study used the multistage sampling technique as study design where samples were taken until the blocks were selected. The minimum sample size was calculated using sample size formula for descriptive categorical study. The assumed prevalence used in the calculation originated from a previous study in Birmingham, UK, which was 307 suspected SLE patients out of 1153 population (26,6%).⁶

Based on the formula, a minimum of 834 samples should be obtained. The data were selected randomly from the secondary source. The inclusion criteria of this study were (1) all people who were at least 18 years old, lived in the selected blocks, had already participated in the “Epidemiology of hypertension and albuminuria in Jatinangor” study, and (2) had already signed the informed consent paper. Those with incomplete data would be dismissed as an exclusion criteria of this study. The exclusion criteria of this study was based on previous studies in Birmingham and Israel which included only people who were at least 18 years old.^{6,7} The total number of respondents of this study was 857 respondents.

The collected data on this study consisted of respondent demography (age and gender), and some of the answers toward the questionnaire given in the previous study was consistent with the Liang questionnaire. The Liang questionnaire comprised 10 questions concerning clinical manifestations of SLE which utilized the American Rheumatism Association preliminary criteria for SLE and had been validated as one of the two stages of SLE screening study design.^{5,6} Data collection of the study was conducted by medical students as the surveyors who had previously received adequate training and standardized instructions from the experts.

Furthermore, the respondent demography was described in general, and then categorized into suspected SLE and not suspected SLE.

The operational definition for suspected SLE is as follows: if there is a ‘positive’ or ‘yes’ answer on more than 3 questions of the Liang questionnaire, then the respondent would be categorized as suspected SLE.⁵ The collected data were then presented in tables.

Results

Eight hundred and fifty seven valid data were obtained after the exclusion and inclusion criteria were met. The authors used all the valid data to increase the intensity of this study instead of using only the minimum samples. Among the total respondents, 69% were female respondents. The highest number was found in the age group 41–50 years (26%), followed by the age group 31–40 years (23%) (Table 1).

This study discovered that among the 785 respondents, approximately 8 % (72 cases) were suspected to have SLE (Table 2). The most common clinical manifestation in suspected SLE respondents was pain and swollen joints, which was found in 76% of the respondents. Most other clinical manifestations found in this study were changes on finger/toes, pleurisy for a few days and photosensitivity (Table 2).

The number of females with suspected SLE were higher compared to the number of males (55 out of 595 vs 17 out of 262 respondents) with 1.47 as the odds ratio. In addition, the highest number of suspected SLE was discovered in the age group 51–60 years (Table 3).

Table 1 Demography Distribution of Respondents

Characteristics	Frequency (n(%))
Gender	
Male	262 (31%)
Female	595 (69%)
Age	
≤20	25 (3%)
21–30	118 (14%)
31–40	201 (23%)
41–50	225 (26%)
51–60	
>60	153 (18%)
135 (16%)	
Total	857