MDJ

Oral Health Status and Treatment Needs among Blind Children in Iraq

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Abstract

Dental caries is a significant public health problem for a large segment of society. Blind people have been described as those who encounter more visual barriers to the receipt of dental care than other people. They may have greater problems accessing dental care or may be at increased risk from dental disease or its treatment**.**

The present study was conducted to assess the caries prevalence, traumatic injuries, levels of oral hygiene and treatment need, in a group of 58 blind children aged (6-15) years. The results were compared with a control group of 58 age and sex matched normal children. The data were collected using the methods and standards recommended by the WHO for oral health survey, 1997.

A highly significant difference between study and controls concerning DMFT and dmft, dental caries was higher among normal students compared to blind one. Where as traumatized teeth were higher among blind compared to normal students with a significant difference, a highly significant difference was seen on comparing between blind and normal students concerning plaque and gingival index, while a significant difference was seen for calculus index, one surface filling was needed by 25.9% of 58 control subjects, while only 5.2% of study group needed this type of treatment, less than 7% of the control group required pulp treatment, while 25.9% needed pulp care in the study group.

The findings of this study demonstrate that blind subjects have a low prevalence of dental caries, poor oral hygiene, and extensive unmet need for dental treatment. This highly alarming situation requires immediate attention.

Key words: Blind, Caries prevalence, Treatment need.

Introduction

The World Health Organization (WHO) defined Health as **"**a state of complete physical, mental, and social well-being, rather than solely the absence of disease" [(1)]. Oral health has been defined as "the standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort and embarrassment and which contributes to general well-being". Oral health has strong biological, psychological and social projections, because it affects aesthetics and communication, and the quality of life is affiliated with oral health status [(2)]. Oral health is linked to happiness and good general health and there is evidence that aesthetically acceptable and functionally adequate dentitions affect self-esteem, confidence and socialization [(3)]. The impact of oral conditions on quality of life can be profound [(4)]. Vision may be

the most important sense for interpreting the world around us, and when sight is impaired in childhood, it can have detrimental effects on physical, neurological, cognitive, and emotional development. Visual impairments vary from total blindness to slight limitations of size, color, distance and shape [5, 6]. Many individuals become blind through complications arising from various diseases of the eye, and from disorders such as cataract and glaucoma. In childhood, the causes of blindness are many; and the most common congenital causes are intrauterine infections, such as rubella and toxoplasmosis and malformations. The other causes among children include malnutrition, infectious diseases and parasitic infestations [7]. Total visual impairment (blindness) affects more than 15 million people The prevalence of visual impairments, ranging from total blindness to slight limitation in vision is 3 children in 1000 [8]. The overall incidence of blindness in children is about 1 in 3000, 46% of these children were born blind, and an additional 38% lost their sight before the age of 1 year [9]. The effects of blindness are many, but one of the most common is the inability of the individual to maintain oral health. The oral health of people who are visually impaired can be disadvantaged, since they are not in a position to detect and recognize early oral disease and may be unable to take immediate action unless informed of the situation. The individual's ability to cope with everyday tasks of personal hygiene, including oral hygiene, is critical to the maintenance of an independent existence [10]. Poor oral hygiene and periodontal disease have been reported in blind subjects [11]. Multi-disabled children, especially the blind, may have a great need for oral health care, this is quite a serious problem. Blind subjects comprise a unique population deserving a special attention, no available studies have been conducted among blind students in Iraq.

This study was conducted in order to evaluate the oral health problems and required treatment among blind students, the data obtained will increase our knowledge regarding the oral health condition of Iraqi blind subjects.

Material and Methods

This study was carried out on 58 blind students aged (6-15) in Al-Noor institution for blindness in Baghdad city, its worth to mention that this is the only institution for blind students in Iraq country, a control group of 58 normal students matching in age and gender were examined in primary and secondary schools, which was used for comparison with the study group. Examination was carried out under standardized conditions following the criteria of WHO 1997 [12], oral examination was carried out using plane mouth mirror and sharp explorer, in addition to periodontal probes used for the detection of gingival inflammation. Dental caries was diagnosed and recorded according to the criteria of Decayed, Missing, and Filled teeth index (DMFT and dmft indices for permanent and deciduous teeth respectively). Radiographs were not used for caries detection. The plaque index of Sillness and Löe [13] was applied for the assessment of the dental plaque adjacent to gingival margin of six index teeth (Ramfjord) [14]. For each index- tooth, the gingival health was evaluated by the application of gingival index of Löe and Sillness [15]. Dental calculus was assessed according to calculus index component of the simplified oral hygiene index of Greene and Vermillion [16]. For estimation of traumatized teeth, all

tooth surfaces with a fracture of the crown were given the score T (WHO, 1997), to receive this score, tooth surface should be missing as a result of trauma and there should be no evidence of caries. Immediately after the caries status of a tooth was recorded, and before proceeding to the next tooth space, the type of treatment required was recorded. Statistical analysis performed using SPSS for Calculation of the statistical parameters, mean and standard deviation. Student's t-test and analysis of variance (ANOVA) for calculating the significance of differences between the different variables.

Results

Table (1) shows the distribution of control and study groups according to age in years and gender. The study group consisted of 58 blind students (30 males, 28 females) with an age range of (6-15) years, in addition to control group matching in age and gender.

Mean values and standard deviations of DMFT for the study group are shown in Table (2). The decayed component contributed to major part in DMFT values, there was an increase in values of (D) fraction with age, similar results was revealed for the DMFT values, for both (D) component and DMFT differences were statistically significant between different age groups (D; F value= 3,179, DMFT; F value= 8,726, df=2, P< 0.05). Concerning the (M), and (F) components, the results revealed a non-significant difference between different age groups (P> 0.05). Comparing between components of DMFT of the same age group, a significant difference was found between D and F fractions at age of 6-9 (P< 0.05). At age 10-13, a highly significant difference was seen between D and F (P <0.001), while a significant difference between M and F fractions was found (P< 0.05). After age 13, a significant difference was revealed between D and F, and between M and F component (P< 0.05).

Table (3) shows the mean and standard deviations of the DMFT of the control group, the largest component was the (D) component, there was an increase in the values of (D) and DMFT with a highly significant difference between different age groups (DMFT; F= 17.688, df =2, P <0.001, D; F= 16,028, df =2, P <0.001), while a non significant difference was seen for (M) and (F) fractions. Comparing between the components of DMFT of the same age group, at age of (6-9), a highly significant difference was found between (D) and (M) fractions, and between (M) and (F) fractions (P <0.001), while a non significant difference was revealed between (D)and (F) components. At age (10-13), and after age (13), a highly significant difference was found between (D) and (M), and between (D) and (F) fractions (P <0.001), a significant difference was seen between (M) and (F) components.

Table(4) illustrates statistical differences in DMFT between study and control groups, a highly significant difference was found between DMFT of study and that of the control, similar results were found on comparing the (M) and (F) components of the study group with that of the control group (DMFT; t = 4.406, M; t = 3.737, for F; t= 7.293, df =114), regarding the decayed component, a significant difference was found on comparing between study and control group (t= 2.354, df= 114, P< 0.05), it is clear that the values of filling component was higher in the control group as compared to the study, while the

missing was higher in the study group compared to the control.

Table (5, 6) show the mean values and standard deviations of dmft for the study and control groups respectively, the mean values of dmft among study group were parabolic with age (with an initial increase and later, a decrease mostly at age of 10-13, then after age 13 the values fell down to zero. The differences were highly significant between different age groups (F= 16.960, df =2, P <0.001). When the components of dmft were analysed separately, the dt fraction had a statistical significant difference (F= 7, 041, df =2, P< 0.05), while a non significant difference was seen for mt and ft.

Concerning the dmft of the control group, there was an initial increase at age (6-9) then a gradual decreasing in the mean values of dmft at age (10-13), over age (13) the values became zero for all components of dmft. Differences were highly significant for dmft and for dt (dmft; F= 43,351, dt; F= 12,547, P <0.001, df =2), for mt and ft, differences were not significant (P> 0.05).

Table(7) illustrates a comparison between components of dmft of study and control groups using t-test, a highly significant difference was found concerning dmft (t-test= 3,586, df= 114, P <0.001), while a significant difference was found on comparing the decayed component (t-test=2,213, P< 0.05), it is clear that the values of dmft and dt were higher in the control group as compared to the study, concerning the differences between the missing component of study and that of the control group, a non significant difference was found (P> 0.05), similar result was found for filling component.

The number and percentage of subjects with traumatic injuries among study group are presented in Table (8), increases in the values was seen with age, about 9.1% had injuries at age (6-9), while 40% of adolescents over (13) years old had traumatic injuries, a non significant difference was found among male between different age groups, similar results was revealed for female between different age groups (P> 0.05). Table (9) illustrates the number and percentage of subjects with traumatic injuries in the control group, increases in the values was seen with age, a non significant difference was found among male and among female between different age group(P> 0.05).

Comparing between study and control groups concerning traumatic injuries Table (10), a significant difference was seen (t-test=2.047, df =114, P< 0.05), it seems that the values of traumatic injuries was higher among study group as compared to the control.

Table (11 and 12) illustrate plaque, gingival and calculus indices for the study and control groups respectively. Statistically, for study group a non-significant difference was found between different age groups. The differences between male and female were not significant. Similar results were revealed concerning the control group.

Table (13) shows a comparison between study and control groups at different age groups regarding oral hygiene indices, a highly significant differences were found concerning plaque, and gingival indices (PlI; t-test= 51.377, GI; t-test=35.856, df=114, P <0.001), the values of plaque and gingival indices were higher among study group compared to the control. For calculus index, a significant difference was seen between study and control group between different age groups (t-test=3.397, df =114, P< 0.05), calculus among study group was higher than that of the control group. The treatment

needs for various age groups for the study and control groups are shown in Table (14 and 15) respectively which was estimated according to WHO guidelines for the whole sample, for the study group, one surface filling was needed by 25.9% of 58 control subjects, while only 5.2% of study group needed this type of treatment, less than 7% of the control group required pulp treatment, while 25.9% needed pulp care in the study group, teeth indicated for extraction in the control group about half the number required extraction in the study group.

Discussion

Sample size and proportion of the blind subjects was not representative as the total population of the blind children and young adults in Iraq were not examined**.** This is the first comprehensive oral health survey of the blind population in Iraq; this survey reinforces and adds information pertaining to differences in prevalence of disease between blind and normal children. In the present study, differences in the prevalence of the dental conditions assessed among blind and normal were significant. An evaluation of the DMFT and dmft scores revealed that the study group had a much lower mean DMFT and dmft components than the control group did. The lowest caries experience observed in the blind group in the present study coincides with that found in other studies [17, 18]. The reasons put forward for this difference in caries increment may be various, ranging from biochemical differences in salivary buffering to differences in living environment, dietary and hygiene habits, different proportions of salivary components and possible differences in chemical composition of the saliva compared to normal children [18, 19], however, further studies are needed to confirm these differences. In this study, as in most studies, increasing age was significantly associated with caries experience in both study and normal groups, this finding was in agreement with many studies which showed an increase in caries prevalence and severity with increasing age, this finding was attributed to the irreversibility and accumulative nature of the disease with age [20, 21].

When the individual components of the mean DMF values were examined, disparities were apparent when subjects with blindness were compared to normal children, marked differences between normal and blind children have been reported in the component parts of the mean DMF. Although the decayed component constituted the major component of DMFT in both study and control groups which may indicates that the unmet treatment need was large with very few children having been treated by a dentist especially among study group, a high demand for provision of dental services, especially to the blind and that this population has received less dental treatment. The trends in this study are similar to those found in other studies [22, 23, 24], the results are of clinical importance, the treatment provided in the primary and permanent dentitions differed considerably between blind and normal children, which emphasize the fact that the blind children are receiving less dental care than their normal counter-parts. It might be explained by that there was a lack of interest to treat this group on the part of the dentist; it has also been shown that the parents of disabled children including blind subjects often become pre-occupied with the medical and social problems they have to face and disregard the need for dental care [25]. The mean dmft for both study and control groups showed an initial

increased then there was a decline in dmft components for both groups at ages 10-13 and more.

The decline of dmft index in older age groups in both groups follows the natural exfoliation of primary teeth. The prevalence of tooth fracture was high in subjects who were blind and a significant difference was found compared to normal subjects in relation to traumatic injuries this is in agreement with other studies who showed that the totally blind seemed to be at greater risk of sustaining a fractured anterior tooth than were the sighted [17, 26]. The prevalence of traumatic injuries was increased with age, which is in agreement with the results of previous studies among blind children [26, 27] and among normal children [28]. The increase in traumatic injuries with advancing age could be also explained by that the children engage in more playful activities and games with increasing age [27, 29]. The oral hygiene indices were examined in both study and control groups, the results shown that poor oral health and extensive gingivitis are the major problems for blind schoolchildren, The oral health of blind people can be disadvantaged, since they are not in a position to detect and recognize early oral disease and may be unable to take immediate action unless informed of the situation. This finding was in agreement with Schembri et al, 2001 who showed that the individual's ability to cope with everyday tasks of personal hygiene, including oral hygiene is critical to the maintenance of an independent existence, lack of proper oral hygiene and the difficulty of these individuals to see and remove plaque have been implicated as the primary factors influencing the prevalence of periodontal disease among blind subjects [19]. Many parents lack the confidence to perform oral hygiene care for their blind child because they do not have enough information about their child's dental growth and development. This fact may be part of the overall parental neglect of these children in relation to other basic health measures or may reflect the attitude that oral health is not important in the overall scheme of health management [30].

In this study, blind children are in far greater need of treatment than normal one as indicated by the high percentage of blind students which required complicated treatment such as pulp therapy and extraction, this may be attributed to negligence on the part of parents and school authorities in obtaining dental treatment for those blind children. These substantial unmet dental needs should prompt efforts by the dental profession to facilitate health care for individuals with blindness and to seek ways to increase their access to dental services. Efforts must be made to encourage the parents and school children to promote and improve their oral health. Mitsea et al [31] concluded that dental health education should be provided to parents and school teachers, to improve the oral health of this social group, motivation and the senses particularly that of touch must be utilized when the blind are instructed in oral hygiene methods.

As a conclusion this study revealed that the oral health in blind subjects is poor, and a majority of the children in the study are in need of specific dental care. The oral health situation of this group must be improved and a suitable system devised for delivery of preventive measures. Special consideration must be given to improving the oral health of blind subjects. There is a clear need to involve the dental profession more actively in dietary counseling and provision of preventive oral health care and treatment. Programmers' of caries and Periodontics prevention must be

implemented for these high-risk children.

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Table (1): Distribution of sample.

Age (year)	Sex	Study group		Control group		Total	
		No.	%	No.	%	No.	%
6-9	Male	11	9.48	11	9.48	22	18.96
	Female	10	8.63	10	8.63	20	17.26
	Total	21	18.11	21	18.11	42	36.22
10-13	Male	14	12.07	14	12.07	28	24.14
	Female	12	10.34	12	10.34	24	20.68
	Total	26	22.41	26	22.41	52	44.82
>13	Male	5	4.31	5	4.31	10	8.62
	Female	6	5.17	6	5.17	12	10.34
	Total	11	9.48	11	9.48	22	18.96
Total	Male	30	25.86	30	25.86	60	51.72
	Female	28	24.14	28	24.14	56	48.28
	Total	58	50.00	58	50.00	116	100.00

Table (2): Caries- experience of permanent teeth (DMFT) among study group by age and gender.

Age (year)	Sex	D		M		F		DMFT	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
6-9	Male	0.90	1.38	0.36	0.92	0.00	0.00	1.27	1.49
	Female	1.10	1.10	1.00	1.05	0.30	0.48	2.10	1.29
	Total	1.00	1.22	0.62	1.20	0.14	0.36	1.66	1.43
10-13	Male	1.50	1.16	0.71	1.14	0.07	0.27	2.28	1.14
	Female	2.00	1.28	0.58	0.98	0.16	0.39	2.75	0.87
	Total	1.73	1.22	0.56	1.06	0.11	0.33	2.50	1.03
>13	Male	1.80	1.16	0.80	0.84	0.20	0.45	2.80	0.84
	Female	2.33	1.28	1.66	1.63	0.17	0.41	4.16	1.17
	Total	2.09	1.51	1.27	1.35	0.18	0.40	3.54	1.21
Total	Male and female	1.53	1.33	0.76	1.17	0.14	0.35	2.40	1.38

Table (3): Caries- experience of permanent teeth (DMFT) among control group by age and gender.

Age (year)	Sex	D		M		F		DMFT	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
6-9	Male	1.18	1.25	0.09	0.30	1.18	1.33	2.45	1.81
	Female	1.40	1.17	0.10	0.32	1.60	1.26	3.10	0.57
	Total	1.28	1.19	0.10	0.30	1.38	1.28	2.76	1.37
10-13	Male	2.21	1.12	0.14	0.36	0.79	1.12	3.14	0.86
	Female	2.08	1.31	0.25	0.45	1.50	0.90	3.83	1.47
	Total	2.15	1.19	0.19	0.40	1.12	1.07	3.46	1.21
>13	Male	3.80	1.87	0.20	0.45	1.40	1.34	5.40	0.55
	Female	3.66	0.82	0.16	0.41	1.50	0.84	5.33	0.52
	Total	3.72	1.10	0.18	0.40	1.45	1.04	5.36	0.50
Total	Male and female	2.14	1.43	0.16	0.37	1.28	1.14	3.57	1.49

Table (4): Statistical differences in DMFT between study and control groups.

Control \ Study	DMFT	DT	MT	FT
DMFT	t = 4.406**			
DT		t =2.354 *		
MT			t = 3.737**	
FT				t =7.293 **

df = 114, * Significant P<0.05, ** Highly Significant P<0.001.

Table (5): Caries- experience of deciduous teeth (dmft) among study group by age and gender.

Age (year)	Sex	d		m		f		dmft	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
6-9	Male	0.81	0.98	0.27	0.65	0.18	0.40	1.27	0.79
	Female	1.60	0.97	0.20	0.63	0.10	0.32	1.90	0.88
	Total	1.19	1.03	0.23	0.62	0.14	0.36	1.57	0.87
10-13	Male	0.78	0.70	0.14	0.36	0.14	0.36	1.07	0.62
	Female	1.08	1.08	0.33	0.78	0.17	0.58	1.58	0.90
	Total	0.92	0.89	0.23	0.59	0.15	0.46	1.30	0.79
>13	Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Female	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	Male and female	0.84	0.95	0.19	0.54	0.12	0.38	1.16	0.93

Table (6): Caries- experience of deciduous teeth (dmft) among control group by age and gender.

Age (year)	Sex	d		m		f		dmft	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
6-9	Male	1.54	1.04	0.36	0.50	0.18	0.40	2.09	**0.83**
	Female	2.30	0.82	0.30	0.48	0.30	0.67	2.90	**0.57**
	Total	1.90	0.99	0.33	0.48	0.23	0.54	2.47	**0.81**
10-13	Male	1.21	1.12	0.35	0.74	0.28	0.83	1.85	**0.77**
	Female	1.50	1.38	0.66	1.30	0.33	0.89	2.50	**0.80**
	Total	1.34	1.23	0.50	1.03	0.30	0.84	2.15	**0.83**
>13	Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Female	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Total	Male and female	1.29	1.21	0.34	0.76	0.22	0.65	1.86	**1.18**

Table (7): Statistical differences in dmft between study and control groups.

Study / Control	dmft	dt	mt	ft
dmft	t = 3.586**			
dt		t =2.213*		
mt			t =1.262	
ft				t =1.048

df = 114, * Significant P<0.05, ** Highly Significant P<0.001, NS Non significant.

Table (8): Number and percentage of subjects in study group with traumatic injury.

Age (year)	Sex	Number of individuals	percentage
6-9	Male	11	1(9.1)
	Female	10	0(0)
10-13	Male	14	2(14.3)
	Female	12	1(8.3)
>13	Male	5	2(40)
	Female	6	0(0)
Total	Male and female	58	6(10.3)

Table (9): Number and percentage of subjects in control group with traumatic injury.

Age (year)	Sex	Number of individuals	percentage
6-9	Male	11	0(0)
	Female	10	0(0)
10-13	Male	14	1(7.1)
	Female	12	0(0)
>13	Male	5	1(20)
	Female	6	0(0)
Total	Male and female	58	2(3.4)

Table (10): Statistical difference in traumatic injuries between study and control groups.

Study / Control	Traumatic injury
Traumatic injury	t = 2.047*

Table (11): Plaque, gingival and calculus indices (means and standard deviation) of study group by age and gender.

Age (year)	Sex	PLI		GI		CaI	
		Mean	SD	Mean	SD	Mean	SD
6-9	Male	2.13	0.09	2.01	0.07	0.00	0.00
	Female	2.08	0.08	2.04	0.05	0.02	0.06
	Total	2.11	0.09	2.03	0.06	0.01	0.04
10-13	Male	2.11	0.10	2.12	0.10	0.05	0.09
	Female	2.11	0.11	2.11	0.11	0.06	0.12
	Total	2.11	0.10	2.11	0.10	0.05	0.11
>13	Male	2.18	0.05	2.15	0.10	0.10	0.10
	Female	2.11	0.06	2.01	0.08	0.05	0.08
	Total	2.14	0.07	2.08	0.11	0.07	0.09
Total	Male and female	2.12	0.09	2.08	0.18	0.04	0.09

Table (12): Plaque, gingival and calculus indices (means and standard deviation) of control group by age and gender.

Age (year)	Sex	PLI		GI		CaI	
		Mean	SD	Mean	SD	Mean	SD
6-9	Male	1.06	0.10	1.07	0.21	0.00	0.00
	Female	1.10	0.11	1.05	0.15	0.00	0.00
	Total	1.08	0.10	1.06	0.18	0.00	0.00
10-13	Male	1.16	0.13	1.17	0.13	0.00	0.00
	Female	1.11	0.13	1.12	0.13	0.00	0.00
	Total	1.14	0.13	1.14	0.13	0.00	0.00
>13	Male	1.16	0.05	1.16	0.05	0.00	0.00
	Female	1.17	0.11	1.18	0.11	0.02	0.04
	Total	1.17	0.08	1.17	0.08	0.01	0.03
Total	Male and female	1.13	0.12	1.04	0.13	0.001	0.01

Table (13): Statistical differences in Plaque, gingival and calculus indices between study and control groups.

Study / Control	Plaque index	Gingival index	Calculus index
Plaque index	**t = 51.377****		
Gingival index		**t =35.856****	
Calculus index			**t =3.397***

Table (14): Number and percentage of subjects in study group in need of any type of dental care.

Age group	No. of individuals	Pit and fissure sealants (%)	One surface filling (%)	Two surfaces filling (%)	Crowns (%)	Veneers (%)	Pulp care (%)	Extraction (%)
6-9	21	10(17.2)	1(1.7)	1(1.7)	0(0)	0(0)	4(6.9)	5(8.6)
10-13	26	6(10.3)	2(3.4)	4(6.9)	0(0)	0(0)	6(10.3)	8(13.8)
>13	11	2(3.4)	0(0)	1(1.7)	0(0)	0(0)	5(8.6)	3(5.2)
Total	58	18(31)	3(5.2)	6(10.3)	0(0)	0(0)	15(25.9)	16(27.6)

Table (15): Number and percentage of subjects in control group in need of any type of dental care.

Age group	No. of individuals	Pit and fissure sealants (%)	One surface Filling (%)	Two surfaces filling (%)	Crowns (%)	Veneers (%)	Pulp care (%)	Extraction (%)
6-9	21	8(13.8)	5(8.6)	5(8.6)	0(0)	0(0)	1(1.7)	2(3.4)
10-13	26	4(6.9)	7(12.1)	9(15.5)	0(0)	0(0)	2(3.4)	4(6.9)
>13	11	0(0)	3(5.2)	5(8.6)	0(0)	0(0)	1(1.7)	2(3.4)
Total	58	12(20.7)	15(25.9)	19(32.8)	0(0)	0(0)	4(6.9)	8(13.8)