

**An-Najah National University
Faculty of Graduate Studies**

**The Prevalence of Dental Caries in Permanent Dentition
for 12 -Year- Old School Children in Northern West Bank**

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DEDICATION

I owe a debt of gratitude to my late father, who inspired me with his lifelong quest for knowledge, my mother for teaching me the values of diligence and patience, and my dear wife, without whose love and support I could not have continued or made graduate studies possible.

With love

Baraa

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ABBREVIATIONS

DMFT : Decayed, Missing and Filled Teeth.

DT : Decayed Teeth .

MT : Missing Teeth.

FT : Filled Teeth.

WHO : World Health Organization.

MOH : Ministry of Health.

BASCD : The British Association for the Study of Community Dentistry.

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ABSTRACT

The aim of the study, conducted in April 2007, was to determine dental caries prevalence among representative sample of 12-year-old schoolchildren in Northern West-Bank, Palestine with a view of determining DMFT mean and Care Experience Index of the studied population. Dental caries was screened according to the WHO method. Out of the 357 children in the age group, 300 children (84%) had dental caries experience as expressed with DMFT index. Only 16% of children were caries free. Female children had higher mean DMFT score of 3.94 compared with 3.04 for males and 3.45 as a mean DMFT for the overall of the sample. Care experience index for the children was very low as only they had a care experience index of 6.7% fluctuates between 7.5% for males and 5.8% for females. Cost of management, defects in establishing and applying of school oral health programs, and Israeli occupation's obstacles, had been identified as some of the factors militating against their obtaining good oral hygiene. The results of this study recommended to improve the situation of school oral health programs, and to focus on dental health education and preventive measures campaigns; fissure sealant, fluoride application as examples.

INTRODUCTION

Introduction

Dental caries is an ecological disease in which the diet, the host and the microbial flora interact over a period of time in such away as to encourage demineralization of the tooth enamel with resultant caries formation. It caused by bacterial infection; it is one of the most common disorders of childhood. It can cause pain, poor sleep and improper eating habits in children. It can be a contributing factor in failure to thrive where children have low weight and height for their age.

Dental decay is considered as one of the most common diseases in the world. Until recently almost everyone had experienced tooth decay in his life time. However, today many people are caries free and there has been a 40-60% reduction in the incidence of tooth decay around the Western World that is due to:

- increase in exposure to fluoride in water, tooth paste and mouth washes.
- increase in awareness of population with regular visits to the dentists.
- improved level of oral health care.
- changing pattern of sugar consumption (Murry,J.J., 1994).

Primary prevention is the prevention of the initialize of the disease; it is the level that seeks to implement programs, procedures or measures to prevent a dental decay before it actually occurs.

Most developed countries and many non-industrialized countries are now well below the World Health Organization (WHO) goal of less than 3.0 decayed, missing or filled teeth per 12 year old child (Renson, C.E. 1986). This is the age of transition from deciduous and mixed dentition to permanent dental status.

The WHO carried out several surveys to evaluate the prevalence of tooth decay all over the World using standardized surveys and indices. The most commonly index was DMFT index, (Hobdell M, et al 2003) which describes the amount -the prevalence- of dental caries in an individual and is obtained by calculating the number of Decayed (D), Missing (M) and filled (F) Teeth. The WHO goal thus indicates that a maximum of three teeth as a mean may be affected by caries at the age of 12. However, a low mean caries level such as "3.0" does not exclude a number of individuals with considerably higher DMFT values in the same population (Global goals for oral health in year 2000 FDI).

And to assess the delivery of dental services to a certain population, care experience index had been relied and viewed in conjunction with DMFT.

Care experience index reflects the restorative care received by those who have suffered disease.

In this study we had estimated DMFT mean and care experience index in Northern West- Bank in order to come out with results and conclusion to desirable prevalence in children in that particular age, compared with oral health in other countries in the world so as to help decision makers in the health sector to set plans and policies to improve Palestinian oral health.

REVIEW OF LITERATURE

Literature Review

There are several reports in the literature describing the prevalence of dental caries among different nations in the world. These reports are considered essential for each country in order to set plans and strategies that aim to eliminate dental caries, and they can make it easy for scientists and health organizations to compare prevalence of caries from one country to another.

Smyth and Caamano (2005) investigated the factors related to the prevalence of dental caries in 12-year-old schoolchildren, in Galiza (northwest Spain). They found out that the decayed, missing and filled permanent teeth DMFT value in the sample was 1.83 (Smyth E, et al 2005).

Da Silva Bastos et al (2005) carried out a study to evaluate the trends in dental caries prevalence in 12-year-old schoolchildren between 1976 and 2001 in Bauru, Brazil using (DMFT) index. They noticed an increase in the number of schoolchildren with sound permanent teeth (DMFT = 0) in urban elementary schools, in more detailing DMFT in 1976 was 9.89 but in 2001 DMFT=1.53. The increase in the number of schoolchildren with sound permanent teeth (DMFT = 0) suggested that the dental health policy in Bauru has had a positive effect in children's dental health, and should therefore be considered for other cities (Dasilva, et al, 2005).

Pitts and Boyles (2006) described the prevalence of Dental caries in sample of 11-year-old children in Great Britain, they found out that the

mean DMFT across England was 0.64, across Wales it was 1.09, and across Scotland values were 1.29 (Pitts et al., 2006)

Other study conducted in Leon, Nicaragua to determine prevalence of dental caries in 6-12-year-old schoolchildren, they found out that caries prevalence in permanent teeth in 12-year-old children was 45%, while DMFT mean is 1.34 (Herrera et al., 2005).

In 2000 Goel et al conducted a survey among 12-13-year-old schoolchildren Putter municipality, Karuataka State, India, to assess the prevalence of dental caries. Results indicated that 59.6% of 12 - 13 year-old had dental caries (mean DMFT = 1.78 +/- 2.01 S.D.) (Goel et al., 2000).

In 2003 Chaffin et al, described the prevalence of dental caries in a sample of Hispanic - American migrant worker's children and compare the results with an earlier Northwest Michigan migrant study to assess if migrant children who aged 5-13 have benefited from global caries decline, DMFT 1.1. and fifty percent of the children were caries free in their permanent dentition, with 17% having DMFT values greater than or equal to 3.0 (Claffin et al., 2003) .

Yee and MacDonald, in 2002, described and analyzed the caries experience and the caries prevalence in the permanent dentition of 12-13-year-old schoolchildren in western and central Nepal, the results came as follows: the caries prevalence and mean DMFT score of 12 – 13 years old were 41% and 1.1 (Yee R et al., 2002).

In Jordan, the prevalence of dental caries in 12-13- year- old students has been found by DMFT index, the mean DMFT was 2.51 (Albashaireh et al., 2002). Other study on Kuwaiti schoolchildren, the prevalence of dental caries for the same age group has been reported to be 2.6 as a DMFT mean. (Al-Mutawa et al., 2006).

Where as, in the West Bank we just have few data available about the prevalence of dental caries, these data were only based on reports of the Ministry of Health, one of the most important thing we can resort to in this case is the comparison done of the DMFT scores for 12-year-old children in the years (1997-2001-2003/04), and the results were ranged from 1.35 in 1997, 2.17 in 2001 and 1.49 in 2003/04 (MOH-PHIC).

AIM OF THE STUDY

Aim of Study

This study had assessed the prevalence of dental caries in permanent dentition in a group of 12 - year - old children of northern West-Bank in Palestine, for the sake of evaluating dental health status, so it gives us a clear idea about the oral health status of the West Bank's children in general. In addition to finding out whether these results fit with WHO criteria.

It also helps decision – makers to improve the situation of oral health through studying the undesired reasons and to maneuver to improve or treat them.

MATERIALS AND METHODS

Materials

1- Sample

To determine the sample size needed, we have determined the population size (the number of 6th grade pupils in the northern governorates of the West Bank) depending on the reports of Ministry of Education 2007 which shown in the following table:

Table (1): Distribution of Population

Governorate	Male	Female	Total
Nablus	3445	3444	6889
Tulkarm	1824	1739	3563
Jenin	1730	1781	3511
Qabatia	1835	1719	3554
Qalqilia	1252	1110	2362
Salfeet	851	826	1677
Total	10937	10619	21556

Table (1) shows the number of the pupils in 6th grade in the northern governorates of the West Bank

If we choose 95% as a confidence level and 4 as confidence interval, we find out that the sample size needed is 584.

I had suggested espousing 350 pupils as a sample size, because the calculated sample (584 subjects) is a large and costly one, and also, many published studies used approximately 350 subjects as a sample size for similar population size.

The schools were chosen using a proportionate sampling method.

The required is 350 student of both sexes, and they should be divided on the six governorates according to the study, thus, choosing 6th grade

students from each governorate must be equal to their total, example, Nablus governorate students are 6889, and the total number of the northern governorates' students is 21556. So, by dividing Nablus students by the aggregate total we find that $6889 / 21556 = 32\%$. consequently, we have to choose 32% of the targeted 350 students from Nablus for the sample. Consequently, $0.32 \times 350 = 112$ students

The following table (table2) shows this percentage and the number of students required for the study from each governorate.

Table(2): The wanted percentage of pupils and wanted sample size in each governorate

Governorate	Percentage of pupils	Wanted sample size
Nablus	32%	112
Tulkarm	16.5%	58
Jenin	16.2%	57
Qabatia	16.5%	58
Qalqilia	10.8%	37
Salfeet	8%	28
Total	100%	350

Table (2) shows the wanted percentage pupils and wanted sample size for each governorate.

Visit permissions and coordination to visit the schools in those governorates were made by The Arab American University, Faculty of Dentistry and Education Directorates in Qabatia and Jenin. As for other governorates, coordination was also made with Education directors, headmasters and supervisors .

2- Inclusion of criteria:

- Full eruption of permanent dentition in both arches through the first permanent molar.
- No previous history of receiving any specific organized preventive treatment.

3- Methods**a. Study design:**

Prevalence survey of a representative sample of 12-year-old children examined according to DMFT index survey methods.

b. Case history:

I. Case history had been taken for each subject including:

- Personal history (name, age, gender, height, weight, and address).
- Medical history (medical conditions, hospitalization, allergies and adverse reactions).
- Dental history (routine dental care, episodic dental care, and symptomatic dental care).

Then the collected data had been registered in diagnostic chart for each subject after the executing of the intra-oral examination on the teeth of subjects that were not brushed or professionally cleaned prior the examination. No radiographic examinations were performed. Diagnosis of

caries was based on the detection of carious lesion at the cavitations stage, in accordance with criteria recommended by the WHO (**World Health Organization 1997**), and documented using decayed (D), missing (M), and filled (F) teeth (T) index. Caries diagnosis was based on visual- tactile criteria using sterile dental mirror and portable torch, in addition to probing by using a sterile dental explorer.

The questionnaire and the examination charts we had used in the study are shown in appendices A, B, and C.

The examples of filled sheets are shown in appendix D. And the pictures show the dental decay, tooth missing and tooth filling are shown in appendix E.

II. WHO Oral Health Assessment forms had been used.

c. Clinical examinations:

Examinations had been carried out through visits to schools. By using plain mirrors, blunt dental explorers (0.6-0.7 mm in diameter) and portable torches as an illumination source, while the subjects were seated down in a chair inside the classroom in a supine position to perform the examination by only one special trained dentist (Dr. Baraa Sabha).

d. Prevalence Index:

It is the simplest index used for measuring dental caries. It describes whether the disease is present or absent.

The prevalence rate = Number of all cases affected with caries / Total population.

e. DMFT Index:

- I. Is a general indicator of dental health status of the population particularly among children and is considered as the most reliable index.
- II. DMFT (Decayed, Missing, and Filled Teeth) Index had been used to measure the prevalence of caries activity. (Klien et al., 1938).
- III. For the DMFT index, teeth that had been extracted for orthodontic purposes, or those that were missing due to trauma or congenitally absent, were excluded from the data processing and therefore did not contribute to the final score. Missing teeth were counted only if there was no doubt that tooth loss was due to caries.
- IV. The collected data had been registered in diagnostic chart for each subject.

f. Care Experience Index:

$(FT/DMFT) \times 100/100$ assesses the delivery of dental services to certain population ; **FT**: it is the number of filled teeth divided by the number of examined students.

g. Statistical Method:

- V. Pilot testing had been performed.
- VI. Descriptive statistics: frequencies, means and standard deviations.
- VII. Statistical assessment and figures had been carried out using SPSS program version 15.

RESULTS

Results

The schools had been visited in the six governorates were chosen randomly and the pupils were chosen randomly too. The distribution of the pupils and the names of these schools are shown in the following table

Table(3): Names of schools and the distribution of pupils according to the governorates

governorate	Name of school	males	females	total
Tulkarm	- Balaa Basic Boys School	31	-	59
	- Zanopia Basic Girls School	-	12	
	- UNRWA Basic Girls School (Noor Shams)	-	16	
Nablus	- UNRWA Basic Boys school (Askar)	25	-	110
	- UNRWA Basic Girls school (Balata)	-	25	
	- Bet Imreen Basic Boys school	20	-	
	- Bet Imreen Basic Girls school	-	20	
	- Nagi Sabha Private school	20	-	
Jenin	- Alyamoon Basic Boys school	20	-	63
	- Alyamoon Basic Girls school	-	15	
	- Alriyad Co- education Private school	19	9	
Qabatia	- Qabatia Basic Girls school	-	25	60
	- Mislya Basic Girls school	-	15	
	- Mislya Basic Boys school	20	-	
Qalqilia	- Imatain Basic Boys school	20	-	35
	- Azzon Basic Girls school	-	15	
Salfeet	- Der Istia Basic Boys school	20	-	30
	- Der Istia Basic Girls school	-	10	
Total		195	162	357

Table (3) shows the names of schools and the distribution of the pupils according to the governorates.

Sample distribution according to sex:

Through a random sample taken from the Northern-West Bank schools, table (4) & figure (1) show that, the size of the whole sample was

(357) pupils: whereas the number of males is (195) equal to (54.6%) of the sample, while females are (162) = (45.4%) of the mentioned sample.

Table (4): Sample Distribution According to Gender

Gender	Frequency	Percent
Male	195	54.6 %
Female	162	45.4 %
Total	357	100 %

Table (4) shows that the number of males were 195, whereas it was 162 females of the whole size of the sample.

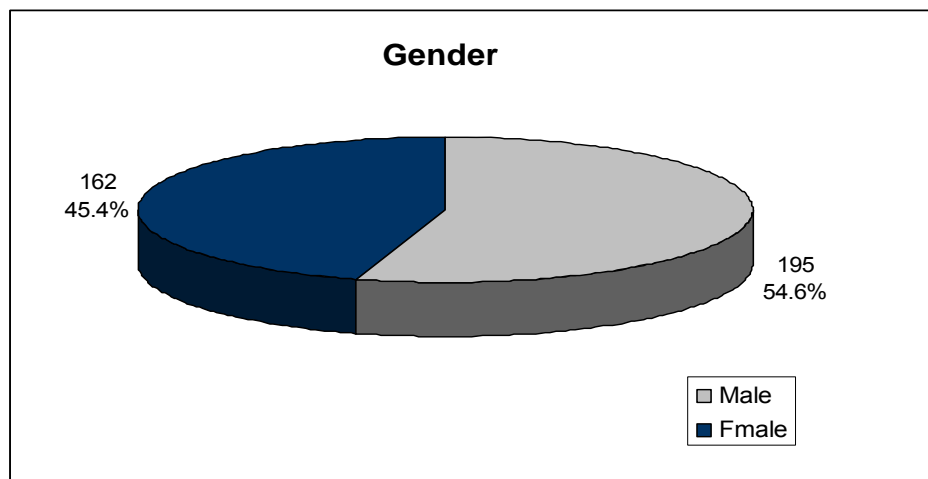


Figure (1): Distribution of Sample according to sex

Figure (1) shows the distribution of the males & females in the sample.

Decay (DT index):

This index gives us apparent idea about the prevalence of dental decay. Table (5) showed that (290) pupils out of (357) = (81.2%) of the overall sample complain of dental decay in one or more of their teeth at the cavitations stage.

Table (5): Sample's Prevalence of Decayed Teeth

Decay	Frequency	Percent
Non-decayed Teeth (pupil)	67	18.8 %
Decayed Teeth (pupil)	290	81.2 %
Total (pupil)	357	100 %

Table (5) shows that 67 pupils 18.8% of the sample, do not suffer from decay at the cavitations stage, whereas 290 of them 81.2%, had it in one or more of their teeth.

While (67) pupils (18.8%) of the same sample, are not suffering of dental decay at the cavitations stage, as appears obvious in figure (2). But if we figure out DT mean, we will find out that the number of decayed teeth in the whole sample (the 357 pupils had been examined) was (1114), and in order to calculate DT mean through this equation, divided by the overall sample size (357 pupils), the outcome of the DT mean will be equal to 3.12 (Standard deviation = 2.62), this means Decayed Teeth (DT mean = 3.12) with (95% CI=2.85-3.39).

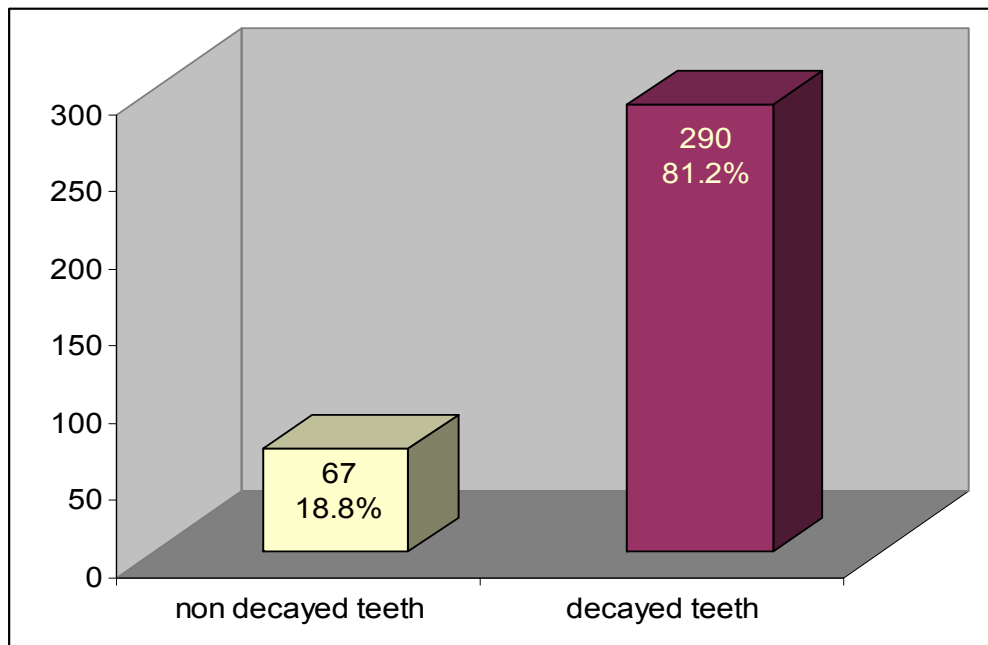
**Figure (2):** Prevalence of Decayed Teeth

Figure (2) shows the differences between the number of pupils with non-decayed and decayed teeth

Missing (MT index):

The second variant, which is abbreviated as MT that means Missing Teeth, shows that the number of the pupils, who suffer from missing 1 or more of their teeth due to caries, is (23), this represents (6.4%) of the overall sample size, while the number of the pupils who did not lose any one of their permanent teeth due to caries was (334), this represents (93.6%), this is clearly appears in table (6).

Table (6): Sample's Prevalence of Missing Teeth

Missing	Frequency	Percent
Non-Missing Teeth (Pupils)	334	93.6 %
Missing Teeth (Pupils)	23	6.4 %
Total	357	100 %

Table (6) shows that 334 of the children = 93.6% of the sample, did not lose any of their permanent teeth, whereas 23 = 6.4% of them lost one or more of their teeth.

It also appears from this result that the prevalence of missing teeth in permanent dentition stage due to caries is 6.4%. Since the number of the missing teeth in the sample as a whole is merely 39 teeth, this mean (MT = 0.11) with (95% CI=0.06-0.16). Thus, the percent of those who resort to the undesirable teeth extraction are very small if compared with those who suffer from decayed teeth, as shown in figure (3):

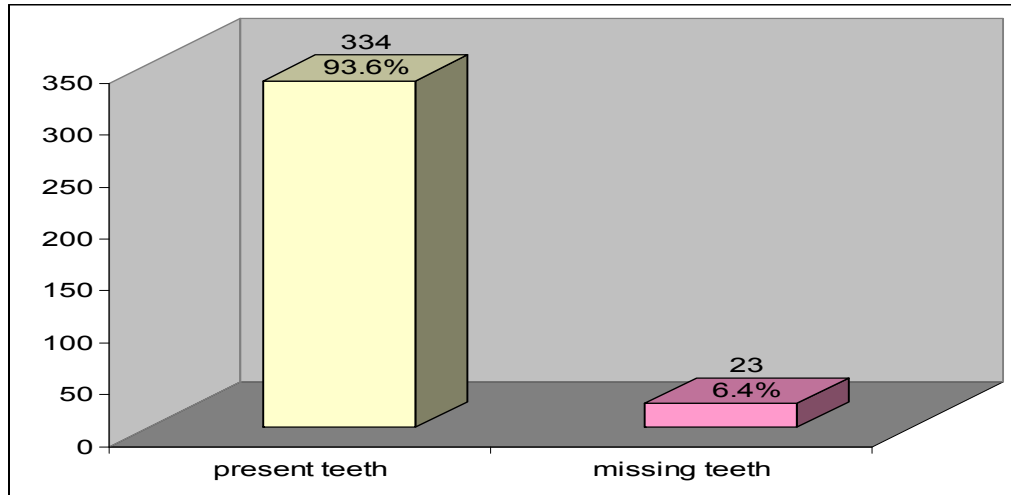


Figure (3): Prevalence of Missing Teeth

Figure (3) shows the difference between the pupils with missing & non-missing teeth

Fillings (FT index):

Through the study and by looking at table (7), it was found that a tooth or more were filled in the mouths of (39) pupils out of (375), this represents 10.9% of the sample. This also means that the percent of the prevalence of dental fillings is 10.9%, which means that 10.9% of the targeted age group was subjected to dental fillings. Figure (4) shows the differences between those who didn't fill any of their teeth and those who treated their decayed teeth by filling. But if we look at the result as arithmetical average, we will find out that the number of the filled teeth in the sample as a whole was (83), thus FT mean = 0.23 (standard deviation = 0.84) and (95% CI=0.15-0.32). This indicates that the average of those who resort to treat their decayed teeth by filling is small if compared with the prevalence of dental decay as shown in table (5).

Table (7): Sample's Prevalence of Filled Teeth

Tooth fillings	Frequency	Percent
Pupils with unfilled teeth	318	89.1 %
Pupils with filled teeth	39	10.9 %
Total	357	100 %

Table (7) shows that 318 of the children = 89.1% of the sample, did not fill any of their teeth, whereas 39 = 10.9% of them, have filled 1 or more of their teeth.

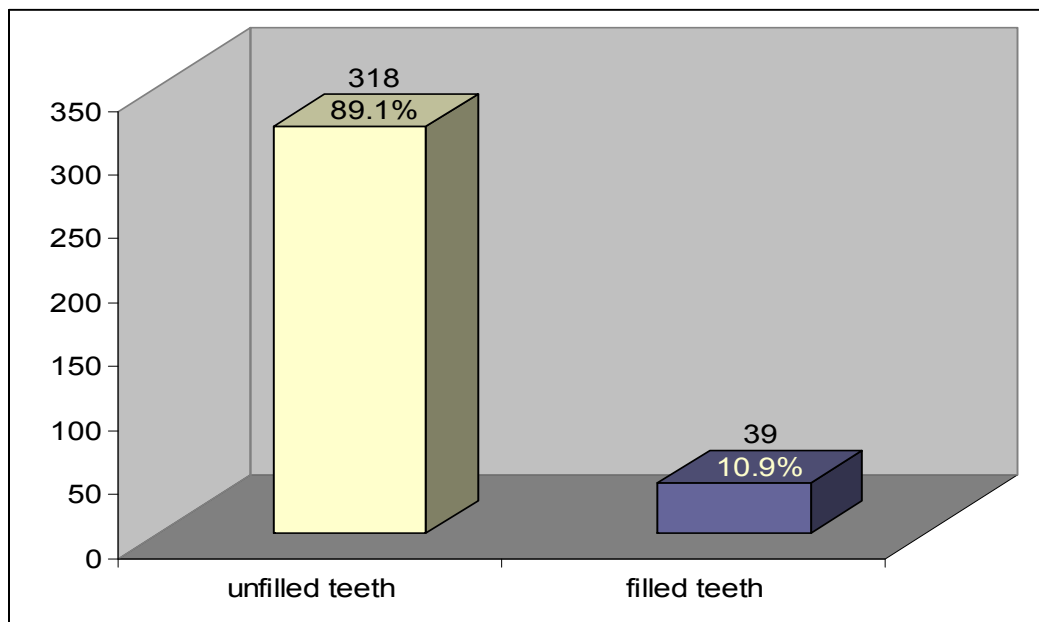
**Figure (4):** Prevalence of Filled Teeth

Figure (4) shows the percent of the pupils with filled & unfilled teeth of the targeted sample.

DMFT index:

This index is the most essential and is the pivotal point of this study, as it among other things includes D: Decayed, M: Missing and F: Filled T: Teeth in permanent dentition. Through the results of this index, we can

answer the basic question about the percent of the prevalence of dental caries and the mean of DMFT for the targeted age group.

Having a look at table (8), we could see that the number of pupils who suffer from Decayed, Missing and Filled Teeth reached (300) out of (357) pupils, this represents (84%) of the pupils, in return for (16%)=(57) pupils merely, who have sound teeth, as figure (5) shows.

Table (8): Sample's prevalence of DMFT

DMFT	Frequency	Percent
Pupils with complete sound teeth	57	16%
Pupils with DMF teeth	300	84 %
Total (pupil)	357	100 %

Table (8) above shows that only 57 pupils have sound teeth, they don't suffer from DMFT, those pupils represent 16% of the sample, while the rest of the 300 pupils, who represent 84% of the sample, have DMFT.

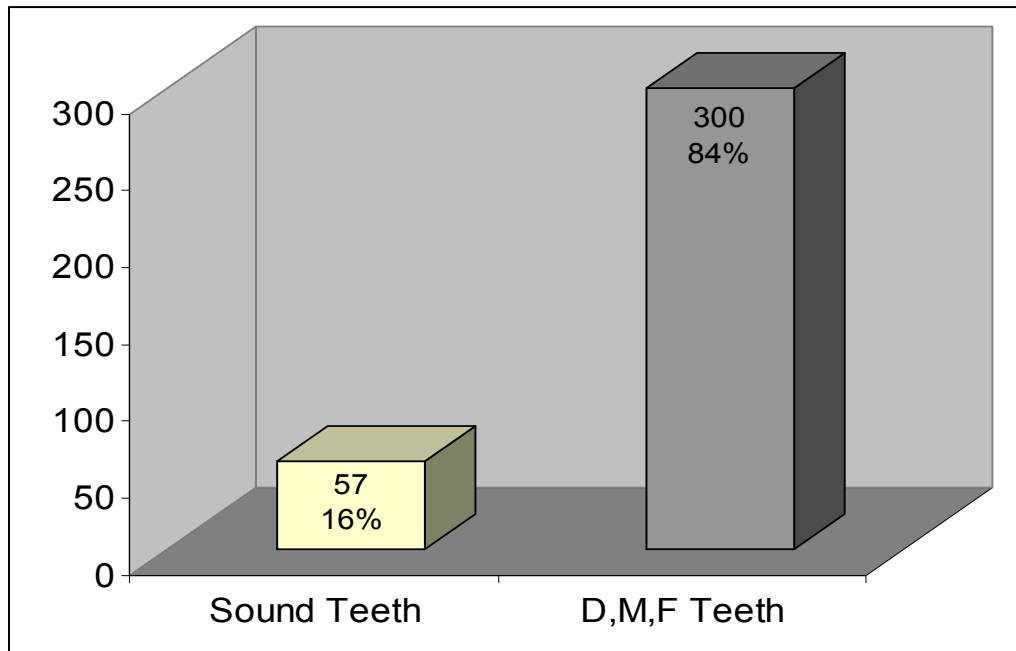


Figure (5): Prevalence of DMFT

Figure (5) shows the difference between the number of pupils with sound teeth and DMF Teeth

Thus, the prevalence of dental caries in permanent dentition for 12-year-old school children in Northern-West Bank is 84%. It means 84% of those children had dental caries experience as expressed with DMFT index. As for, DMFT mean, it reached up to 3.45 (95% CI=3.17-3.74), this result had been obtained by collecting decayed, missing and filled teeth ($1114+39+83=1236$) divided by the overall sample size (357) through this equation ($1236/357=3.45$), this value is higher than the rate of the WHO's global goal (DMFT mean < 3).

With additional details and with the assistance of table (9) and figure (6), we can say that 57 pupils had complete sound teeth, of whom 37 males and 20 females. While the number of pupils who have range $1 \leq \text{DMFT} \leq 3$ was: 125 pupils, of whom 76 males and 49 females. The number of pupils, who have $\text{DMFT} > 3$ was: 175, of whom 82 male and 93 female. This percent is high if compared with the goals of (WHO).

Table (9): Distribution of the DMFT According to Sex & WHO Criteria

Gender	DMF = 0	$1 \leq \text{DMF} \leq 3$	DMF > 3	Total
Male	37	76	82	195
Female	20	49	93	162
Total	57	125	175	357

The above table shows that 57 pupils had complete sound teeth, of whom 37 males and 20 females, while DMFT in 125 pupils averaged between 1 – 3, of whom 76 males and 49 females, and 175 pupils had $\text{DMFT} > 3$, of whom 82 males and 93 females.

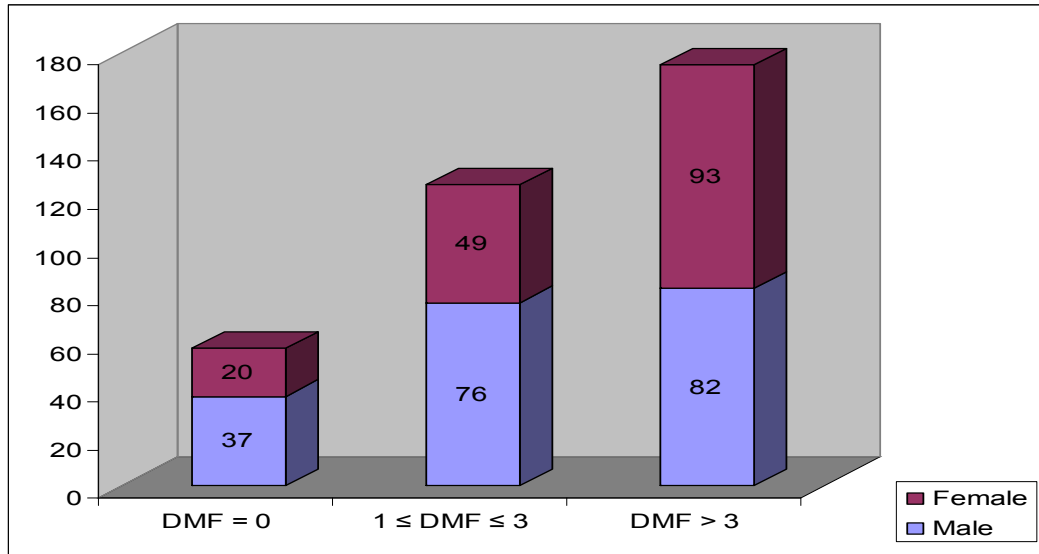


Figure (6): Distribution of the DMFT mean According to Sex & WHO Criteria

Figure (6) shows the distribution of DMFT between males and females, and the way of distribution.

In the combination of DMFT, DT, MT and FT results came as follows:

- DT is the major contributor to the DMFT scores, while MT is the smallest one. This is true in both sexes, as shown in table (10). As for FT, it is very small if compared with DT.
- Females had dental caries experience more than males in permanent dentition for 12-year-old schoolchildren.
- The biggest percentage of children are those DMFT > 3, and the lowest percentage is DMFT = 0.0 This is true in both sexes.

Table (10): The means of all Variations

Gender		Decay	Missing	Filled	DMF
Male	Mean	2.73	0.09	0.23	3.05
	N	195	195	195	195
Female	Mean	3.59	0.14	0.23	3.94
	N	162	162	162	162
Total	Mean	3.12	0.11	0.23	3.45
	N	357	357	357	357

Table (10) shows the differences among the arithmetical average between males & females in all variations mentioned before.

Care Experience Index: $(FT / DMFT) \times 100 / 100$

Best presented, when compared with original DMFT mean, as shown in figure (7).

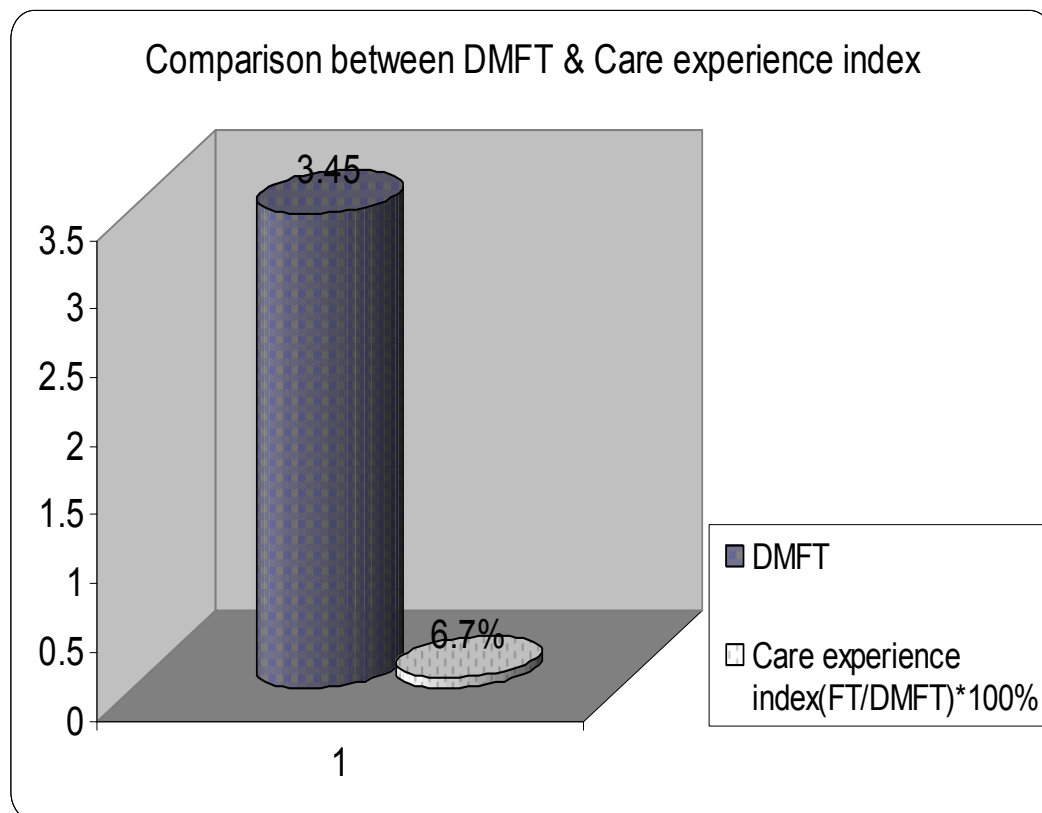


Figure (7): Comparison between DMFT & Care experience index

Figure (7) shows a comparison between DMFT & Care Experience Index

Care experience index is more in males than in females, see table (11). It demonstrates a poor pattern of oral hygiene, and presents small percentages from DMFT values. Males had a care experience index of 7.5% and females scored 5.8%, with an average of 6.7% for both sexes.

Table (11): The Variations of Care Experience Index

Gender	Care experience index = (FT/DMFT)*100%
Male	7.5%
Female	5.8%
Total	6.7%

Table (11) shows the differences between the variation of Care Experience Index between the males & females.

Distribution of the study sample according to the variation of Gender & residency area (cities, rural areas, refugee camps):

The sample study includes most of northern Palestinian cities, villages, and refugee camps, the boys were distributed among these areas as appears in the table (12) below

Table (12): Distribution of the sample according to residency and sex of the examined pupils

Residential area	cities	rural areas	camp	total
Gender				
Male	39	131	25	195
Female	46	75	41	162
Total	85	206	66	357

The above table shows that the number of school-pupils of the cities in the sample was 85, of whom 39 boys and 64 girls, while school-pupils of the villages was 206 of whom 131 boys and 75 girls, but school-pupils of the refugee camps was 66, of whom 25 boys and 51 girls.

The following figure (8) shows these distributions as for the variation of residency and sex. The highest percent (57.7%) of examined students was among Basic School Students living in villages, then cities (23.8%), and finally UNRWA's students, where it was the lowest (18.5%).

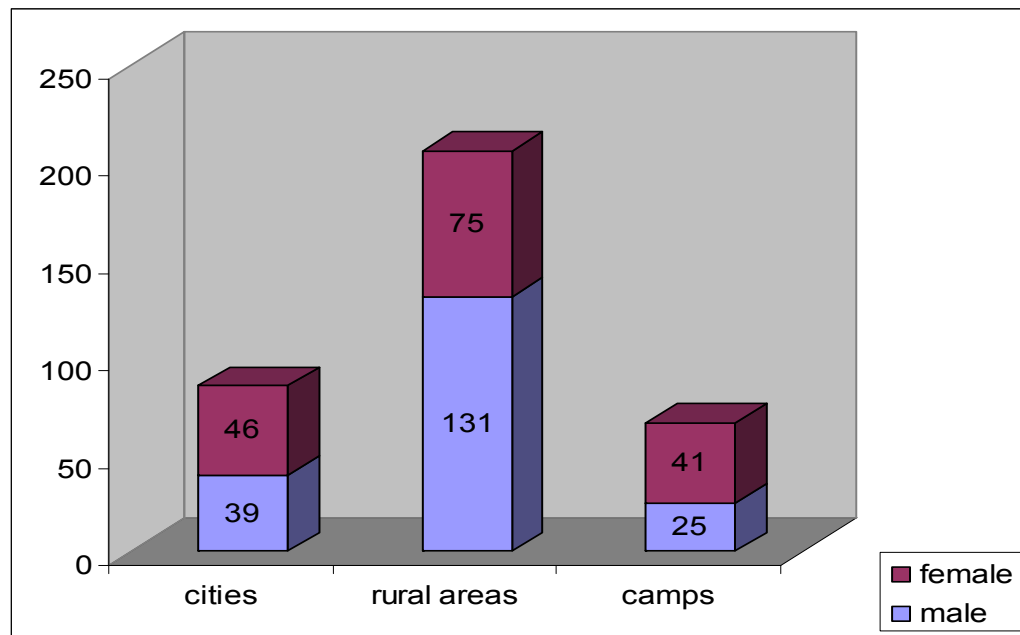


Figure (8): distribution of sample study according to residency and sex

The figure (8) shows that 85 pupils had been examined in the cities, 39 of them were males and 46 of them were females. 206 pupils had been examined in the rural areas, the males were 131 and females were 75. While 66 pupils had been examined in the camps, 25 of them were males and 41 were females.

Distribution of DT, MT, FT, and DMFT according to residency area:

The following tables show how variations of study were distributed (DT, MT, FT, and DMFT) according to residency.

The following table (13) shows that 68 out of 85 examined students in cities' schools were suffering from dental decay, that means the percent of pupils were suffering from dental decay among cities schools for children aged 12 years was 80%, in return for 20% of them didn't suffer from dental decay.

But the percent of pupils with decayed teeth among villages' schools was 82%, which means 169 out of 206 examined-students at the schools of northern West Bank's villages were suffering from dental decay.

As for the percent of pupils were suffering from decayed teeth among the mentioned camps, was 80%, whereas 53 out of 66 examined students of UNRWA's schools were suffering from dental decay. Thus, we found that variation of prevalence of dental decay among students of cities, villages and refugee camps was nearly the same.

Table (13): Distribution of pupils with decayed teeth according to residency

Residency area	Non-decayed teeth (pupils)	Decayed teeth (pupils)	Total
Cities	17	68	85
rural areas	37	169	206
Camps	13	53	66
Total	67	290	357

Regarding the missing teeth, by table (14) below, we can see that prevalence of missing teeth due to caries among the mentioned cities schools' students aged 12 was 8.2%, where 7 out of 85 students suffered from missing teeth, but it was 5.3% among villages schools' students of the same age, where 11 out of 206 students were suffering from missing teeth.

However, the percent was 7.6% among students of UNRWA schools, only 5 out of 66 examined students from northern West Bank were suffering from missing teeth.

Table (14): Distribution of missing teeth pupils according to residency

Residency area	Complete present teeth (pupils)	missing teeth (pupils)	Total
Cities	78	7	85
rural areas	195	11	206
Camps	61	5	66
Total	334	23	357

As for the filled teeth, the prevalence of teeth filling was the highest (14.1%) among examined cities schools' students, where 12 out of 85 students had filled one or more of their teeth, followed by villages schools' students (10.2%), and finally (9.1%) was among refugee camps' students, where 6 out of 66 students of these camps for the same age had filled one or more of their teeth, as shown in table (15).

Table (15): Distribution of pupils with filled teeth according to residency

Residency area	unfilled teeth (pupils)	filled teeth (pupils)	Total
Cities	73	12	85
rural areas	185	21	206
Camps	60	6	66
Total	318	39	357

In fact, table (16) while is the most important as it shows the number of pupils who suffered from decayed, missing and filled teeth among the 12-year-old students of cities, villages and refugee camps in the northern West Bank. We noticed that 72 out 85 students had experienced dental caries; therefore, the prevalence of dental caries in cities' schools was 84.7%.

In villages, this percent was 85%, this means 175 out of 206 had experienced dental caries, but in UNRWA schools, the percent was 80.3%, whereas 53 out of 66 students were suffering from decayed, missing or filled teeth.

By having a look at the previous results, we can say that the prevalence of dental caries in permanent dentition for 12-year-old schoolchildren was nearly the same in the all mentioned residency areas (cities, rural areas and camps).

Table (16): Distribution of DMF variation according to residency

Residency area	Complete sound teeth (pupils)	D,M,F teeth (pupils)	Total
cities	13	72	85
rural areas	31	175	206
camps	13	53	66
Total	57	300	357

Means of (DT, MT, FT and DMFT)

The following tables show the means and standard deviations of the mentioned variations according to residency:

Table (17) explains the difference between DT means among students of cities, villages and refugee camps. We noticed that DT mean for students in cities was 3.21, villages 3.12 and it was 3.02 in refugee camps

Table (17): the means and standard deviations for decayed teeth according to residency area

Residency area	Number of examined pupils	mean	Standard deviation
cities	85	3.21	2.75
rural areas	206	3.12	2.68
camps	66	3.02	2.26
Total	357	3.12	2.62

As a result, no tangible differences seen in DT means among the three targeted areas.

In addition, MT means for the students of cities, villages and refugee camps were very close, too. Table (18) explains that DT mean for the students of cities was 0.13, villages students was 0.10 and it was 0.12 for refugee camps' students.. DT mean was 0.11 for the three targeted areas.

Table (18): the means and standard deviations for Missing teeth according to residency area

Residency area	Number of examined pupils	Mean	Standard deviation
cities	85	0.13	0.53
rural areas	206	0.10	0.51
camps	66	0.12	0.48
Total	357	0.11	0.51

Table (19) explains the differences in FT means among students of the mentioned cities, villages and refugee camps. For cities students, it was 0.38, villages students 0.21 and 0.11 for refugee camp students. It was the

highest among cities students, then villages' students and then refugee camps' students.

Table (19): the means and standard deviations for filled teeth according to residency

Residency area	Number of examined pupils	mean	Standard deviation
cities	85	0.38	1.23
rural areas	206	0.21	0.74
camps	66	0.11	0.36
Total	357	0.23	0.84

Looking at DMFT means, we can see that DMFT mean was nearly the same among cities, villages and refugee camps. It was 3.72 to students of cities, 3.41 for villages students and 3.24 for students of refugee camps (UNRWA schools), as table (20) shows:

Table (20): The means and standard deviations of DMFT according to residency area

Residency area	Number of examined pupils	Mean	Standard deviation
cities	85	3.72	2.83
Rural areas	206	3.41	2.80
camps	66	3.24	2.35
Total	357	3.45	2.73

As a consequence, the mean of DMFT doesn't significantly differ among students of cities, villages and refugee camps.

At a time when we examined the Null Hypothesis for the previous variations, we have reached to the following results:

- The mean of tooth decay variation was the same for the students of cities, villages and refugee camps.

- The mean of missing teeth variation was the same for the students of cities, villages and refugee camps.
- The mean of teeth filling variation was the same for the students of cities, villages and refugee camps.
- The mean of DMFT variation was the same for the students of cities, villages and refugee camps.

Consequently, we have reached to the point that prevalence of dental caries among children aged 12 years in the northern West Bank was almost the same at all residential areas whether cities, villages or refugee camps.

Although, the large number of the sample was from the villages, and it was the smallest among refugee camps' students, nevertheless the result of the study was not affected.

DISCUSSION

Discussion

This sample study was conducted in several schools at six governorates in Northern West Bank, on 6th grade pupils, who are 12-year old. The aim of the study is to evaluate dental health status, so it gives us a clear idea about the dental health status of the West Bank's children in general. It also helps decision-makers to improve the situation of oral health through studying the undesired reasons and to maneuver to improve or treat them.

This study was also designed to test a hypothesis that the prevalence of dental caries among Palestinian schoolchildren is higher than 3.0 as a DMFT mean, which is the global goal of (WHO). And it is designed to test if DMFT mean in West-Bank is higher than DMFT mean in other countries, especially these around us.

However, the mean DMFT index for 12-year-old Palestinian schoolchildren is 3.45 (95% CI = 3.17 – 3.74), and 84% (95% CI = 81% - 88%) of the children had a dental caries experience. These values are higher than the mean DMFT for 12-year-old schoolchildren accepted by the (WHO) that must be less or equal to 3.0. It is also bigger than many other countries.

In many countries, such as, industrialized countries e.g. Great Britain, it was found that the mean DMFT across England was (0.64). In Wales it was 1.09, and in Scotland it was (1.29) (Pitts et al., 2006). In other

study conducted in Italy, it was (1.1) (Gampus et al., 2006). Also in South Africa as a developing country DMFT mean for similar age was 1.1 (Van Wyk et al., 2004).

With regard to the neighboring countries such as Jordan, DMFT index for the same age was 2.51 (Albashaireh et al., 2002), while in Kuwaiti schoolchildren it was 2.6 (Al-Mutawa et al., 2006). and finally in Syria, DMFT mean fluctuated between (1.4 – 2.5) for the same ages in 2004 (Beiruti, N. 2004). But in Israel the mean DMFT was 1.66 (Zusman et al., 2005). These results show that DMFT mean in Palestine is higher than the standard value of (WHO), that must not exceed 3.0 , at the same time it is high if compared with neighboring and many other countries .

Furthermore, (WHO)'s Oral Health Data Bank in 1980, release DMFT values at age 12-year for 107 of 173 countries. Of these, 51% had 3.0 DMFT or less, while the remaining 49% had higher values. In the year 2000, Data were available for 184 countries as recorded in the WHO Oral Health Country / Area Profile; of these, 68% had less than three DMFT (Oral Health Survey).

In this study, we found that only 16% of 12-year -old schoolchildren had DMFT = 0, while its higher in other countries, for example, England & Wales, as industrialized countries 68.7% of the 12-year-old schoolchildren were caries free; while in Scotland the percentage was 52.9% (Pitts et al., 2006). As for Nigeria, as a developing country, it was found that 85% of 12-year old schoolchildren were caries free (Obafunke et al., 2005). In return

for 27.1% of the pupils In Jordan was caries free (Albashaireh et al., 2002), and in Kuwait it is 26.4% (Al-Mutawa et al., 2006).

It seems that the prevalence of dental caries in permanent dentition for 12-year- old school children in Northern West-Bank is higher than many other countries.

Care experience Index in this study ranged from; 5.8% in females, in return for 7.5% in males, with a 6.7% as a mean value. These results could be considered very low when compared with the United Kingdom, UK, BASCD survey values. UK care Index mean was 12% in 1995/96 then improved to 55% in 2002 / 2003 BASCD survey results (Pitts NB et al., 2002).

Care Experience Index reflects the restorative care received by those who have suffered disease; it therefore has to be viewed in conjunction with DMFT. These results are of great interest in studying the provision of dental services to the age group under study.

The main reasons for the undesired rise in the rate of caries, which exceeded the standard value 3.0, plus the low of (FT mean) and the Care Experience Index are: the low level of Oral Health Care, resulting from the defects of establishing "School Oral Health Programs" and reasonable methods to apply them.

At the very beginning, the Ministry of Health and the Ministry of Education should hold the responsibility for that, as they did not cooperate or coordinate their efforts to prepare these programs. Furthermore, many

factors had hindered implementing these programs comprehensively, among of which:

- Lack of possibilities and financing of these programs, in addition to shortage of dental materials.
- Difficult access of the workers in these programs to the targeted areas, especially remote rural areas, due to the Israeli occupation complicated measures between the Palestinian governorates, such as, military checkpoints, roadblocks, curfews and the apartheid separation wall, which separate rural areas from main cities.

Based on the real life experiences of Medecins du Monde medical staff and their partners in their workplaces, difficulties for the population in gaining access to medical organizations, restrictions imposed on access to the patients by medical personnel, and failure to protect the medical services (medical personnel, health care vehicles and hospital facilities) were some of the obstacles that faced health services and public health workers in Palestinian occupied territories (**Medicins du monde 2003**).

- Disorder taking place in the schools because of the frequent strikes, along with other events that prevent students from attending classes regularly, hinder applying those programs on them.
- Scarcity of up-to-date equipments due to the complicated measures of the Israeli occupation forces on the crossing points, and the lack of financial support.

- A decrease in the quality and quantity of educational lectures, and the low focus on dental health education.
- Insufficient preventive measures campaigns; fissure sealant and topical fluoride application as examples.
- A few number of dentists involved in these programs, so we noticed that, dentists who visit schools have to leave the MOH clinics to follow up the schools oral health programs.
- When dentists refer diseased pupils to MOH's dental clinics, many of them could not reach their destination as of the complicated measures on the Israeli occupation's obstacles.
- MOH's dental clinics working hours commence from 08:00 am to 02:00 pm, where pupils are at school.
- Insufficient dental clinics operated by MOH that offer free of charge treatment.
- Inadequate services are provided in those clinics; very little dental specialties are offered.
- The current economic situation, and the high cost of dental treatment, as well as the absence of a comprehensive Dental Health Insurance System are not less important than what we mentioned above.

CONCLUSION

Conclusion

In conclusion, dental health services should focus primarily on the prevention of dental caries since the cost of management may be out of the reach of many, who may be affected in the West Bank.

The role of primary health care workers should not be underestimated as they can perform primary prevention programs among school children in the form of oral health education with emphasis on snacking habits of schoolchildren and regular visits to the dentists. Use of fluorides especially in toothpastes has been documented with much benefit in caries prevention (Stamm 1993) (Adyatmaka 1998), and therefore, its use in caries prevention should be carried out on those children.

RECOMMENDATIONS

Recommendations

- During the founding of School Oral Health Program, planners should benefit from the foreign and domestic experiences, such as the Palestinian Dental schools.
- Obvious and up-to-date strategies and policies to facilitate this process should be developed.
- Effective channels of communication should be established between the ministries of health and education, local health and education authorities, schools, communities, teachers and pupils.
- Phone calls and scheduling meetings with similar health programs should be done, to share experience and results.
- Available funding should be directed towards these programs, especially preventive more than curative ones; fissure sealants, fluoride mouth rinses and improving existing screening programs would be very beneficial. Focusing on dental health awareness campaigns, lectures, handouts ...etc, as prevention is better than treatment.
- Staff orientation and adequate training should be conducted.
- More incentives should be offered for dentists that work in public clinics, especially in remote rural areas.
- Mobile Dental Clinics could help in reaching rural areas that lack dental services.

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APPINDICES

Appendix A: Oral Health survey questionnaire

Oral Health Survey
Questionnaire

Name: _____ Age: _____ Sex: _____
 Height: _____ Weight: _____ Place of Birth: _____

* Tick the Correct Answer:

1. Do you brush your teeth daily?
 Yes: _____ No: _____
 if yes, how many times do you brush your teeth daily? _____
2. When do you brush your teeth?
 - After walking up _____ - Before sleeping _____
 - After breakfast _____ - After dinner _____
 - After launch _____
3. How long does the brushing last?
 15 seconds _____ 60 seconds _____
 30 seconds _____ more than 1 minute _____
4. Do you use toothpaste with brush?
 Rarely _____ Usually _____ Always _____
5. Do you use others except toothpaste and brush for cleaning your teeth?
 (e.g.: Miswak, water and salt,...)
 Yes _____ No _____
6. Who taught you how to use a toothbrush?
 Your family _____ Teacher's school _____ by yourself _____
7. Does your gum bleed when using a toothbrush or eating a hard fruit?
 Yes _____ No _____
8. Does your gum swallow?
 Yes _____ No _____
9. Do the food particles pack between your teeth?
 Yes _____ No _____
 If yes, how do you remove them? _____
10. Have you ever had inflamed gum?
 Yes _____ No _____
 If yes, when was the last time (month, year)? _____

11. If you had inflamed gum, did you treat it?
 Yes _____ No _____
 how? _____
12. Do you feel dyspnea when you breathe from your nose or mouth?
 Yes _____ No _____
13. Have you ever been told that you sneeze when you are asleep?
 Yes _____ No _____
14. Do you clench on your teeth, or do you have Bruxism?
 Yes _____ No _____
15. Do your brothers or sisters complain from their gum?
 Yes _____ No _____
16. Do you feel you have halitosis? Are you told that?
 Yes _____ No _____
17. Did you visit a dentist?
 Yes _____ No _____
 When?
 A- last month _____ B- Last 6 months _____
 C- Last year _____ D- more than year ago _____
18. Why did you do that (visiting your dentist)?
 Checking up _____ Toothach _____
 Gum bleeding or pain _____ Tooth extraction _____
 Others _____
19. How do you feel in your general health?
 Good _____ Fair _____
 Bad _____
20. Do you use preventive measures other than tooth brushing?
 Yes _____ No _____
 If yes: A- Fluoride Gel Application _____ B- Dental floss _____
 C- Water fluoridation _____ D- Fissure Sealants _____

Appendix B: Oral Health survey questionnaire translated to Arabic

استمارة المسح السني لدراسة انتشار النخر السني في شمال الضفة الغربية. جامعة النجاح الوطنية

الاسم: _____ العمر: _____ الجنس: _____
الطول: _____ الوزن: _____ مكان الولادة: _____

*ضع إشارة على الإجابة الصحيحة:

- 1- هل تفرشي أسنانك يوميا؟
- نعم:----- - لا:-----
إذا كانت الإجابة نعم فكم مرة تفرشي أسنانك باليوم؟
- 2- متى تفرشي أسنانك؟
- بعد الاستيقاظ من النوم----- - قبل النوم-----
- بعد تناول وجبة الفطور----- - بعد تناول وجبة العشاء-----
- بعد تناول الغداء-----
- 3- كم من الوقت يستغرق تفريش أسنانك؟
- 15 ثانية----- - 60 ثانية-----
- 30 ثانية----- - أكثر من دقيقة-----
- 4- هل تستخدم معجون أسنان مع الفرشاة؟
- نادرا----- - غالبا----- - دائما-----
- 5- هل تستخدم معاجين أخرى أو مواد أخرى لتنظيف أسنانك؟
(مثال: محلول الماء مع الملح , السواك,.....)
- نعم:----- - لا:-----
- 6- من الذي علمك طريقة استخدام فرشاة الأسنان؟
- عائلتك----- - المدرس في مدرستك----- - تعلمت من تلقاء نفسك-----
- 7- هل تشكو من نزيف في اللثة عند استخدامك لفرشاة الأسنان أو عند تناولك الفواكه القاسية؟
- نعم----- - لا-----
- 8- هل تنتفخ وتتورم لثتك باستمرار؟
- نعم----- - لا-----
- 9- هل تنحصر بقايا الأطعمة بين أسنانك؟
- نعم----- - لا-----
إذا كانت الإجابة نعم كيف تتخلص من هذه البقايا؟.....
- 10- هل عانيت من لثة ملتهبة فيما سبق؟
- نعم----- - لا-----
إذا كانت الإجابة نعم متى كانت آخر مرة (شهر , سنة)؟

11- إذا كانت الإجابة نعم' فهل قمت بمعالجتها؟

- نعم----- - لا-----

-----كيف؟

12- هل تشعر بضيق تنفس عندما تتنفس من أنفك أو فمك؟

- نعم----- - لا-----

13- هل سبق وأخبرك أحد أنك تصدر أصوات شخير أثناء نومك؟

- نعم----- - لا-----

14- هل تكز على أسنانك أو تعاني من صرير الأسنان؟ نعم..... لا.....

15- هل لدى إخوتك أو أخواتك مشاكل لثوية؟

- نعم----- - لا-----

16- هل تشعر بأن لديك رائحة كريهة للفم؟ هل سبق وأخبرك أحد بذلك؟

- نعم----- - لا-----

17- هل سبق وزرت طبيب الأسنان؟

- نعم----- - لا-----

متى؟

الشهر الماضي..... الأشهر الست السابقة.....

في السنة الماضية..... قبل أكثر من سنة.....

18- لماذا قمت بزيارة طبيب الأسنان؟

- للكشف فقط----- - ألم سني-----

- نرف وألم لثوي----- - لإجراء قلع سني.....

- أمور أخرى-----

19- كيف تقيم صحتك بشكل عام؟

- جيدة----- - مقبولة-----

- سيئة-----

20- هل تستخدم أساليب وقائية بالإضافة لتفرش الأسنان؟

- نعم----- - لا-----

إذا كانت الإجابة نعم:

- تطبيق جل الفلورايد----- - الخيوط السنية-----

- الماء المفلور----- - المادة السادة لشقوق الأسنان-----

د.براء صبحة

Appendix C: Caries recording form

Dental status/Caries Recording Form

				55	54	53	52	51		61	62	63	64	65				
	18	17	16	15	14	13	12	11		21	22	23	24	25	26	27	28	
o																		
m																		
b																		
d																		
l																		

Permanent		Primary
0	sound	A
1	decayed	B
2	filled & decayed	C
3	filled, no decay	D
4	missing due caries	E
5	missing, other reason	-
6	sealant	-
7	bridge abutment, crown	G
8	unerupted	-
9	excluded	-

	48	47	46	45	44	43	42	41		31	32	33	34	35	36	37	38	
o																		
m																		
b																		
d																		
l																		
				85	84	83	82	81		71	72	73	74	75				

DMFT: D _____ M _____ F _____ = _____

DMFS: D _____ M _____ F _____ = _____

Appendix D: filled questionnaire and filled caries recording form

Oral Health Survey
Questionnaire

Name: Amal Age: 12 Sex: ♀
 Height: 147 Weight: 45 kg Place of Birth: India

* Tick the Correct Answer:

- Do you brush your teeth daily?
 Yes: _____ No:
 if yes, how many times do you brush your teeth daily? _____
- When do you brush your teeth?
 - After walking up _____ - Before sleeping
 - After breakfast _____ - After dinner _____
 - After launch _____
- How long does the brushing last?
 15 seconds _____ 60 seconds _____
 30 seconds more than 1 minute _____
- Do you use toothpaste with brush?
 Rarely _____ Usually _____ Always
- Do you use others except toothpaste and brush for cleaning your teeth?
 (e.g.: Miswak, water and salt,...)
 Yes _____ No
- Who taught you how to use a toothbrush?
 Your family Teacher's school _____ by yourself _____
- Does your gum bleed when using a toothbrush or eating a hard fruit?
 Yes _____ No
- Does your gum swallow?
 Yes _____ No
- Do the food particles pack between your teeth?
 Yes No _____
 If yes, how do you remove them? _____
- Have you ever had inflamed gum?
 Yes _____ No
 If yes, when was the last time (month, year)? _____

11. If you had inflamed gum, did you treat it?
 Yes _____ No _____
 how? _____
12. Do you feel dyspnea when you breathe from your nose or mouth?
 Yes _____ No
13. Have you ever been told that you sneeze when you are asleep?
 Yes _____ No
14. Do you clench on your teeth, or do you have Bruxism?
 Yes _____ No
15. Do your brothers or sisters complain from their gum?
 Yes _____ No
16. Do you feel you have halitosis? Are you told that?
 Yes _____ No
17. Did you visit a dentist?
 Yes _____ No
 When?
 A- last month _____ B- Last 6 months _____
 C- Last year _____ D- more than year ago _____
18. Why did you do that (visiting your dentist)?
 Checking up _____ Toothach _____
 Gum bleeding or pain _____ Tooth extraction _____
 Others _____
19. How do you feel in your general health?
 Good Fair _____
 Bad _____
20. Do you use preventive measures other than tooth brushing?
 Yes _____ No
 If yes: A- Fluoride Gel Application _____ B- Dental floss _____
 C- Water fluoridation _____ D- Fissure Sealants _____

عدد الأسنان اللبنية - 20

Name: هدى محمد Gender: Female

Age: 12 year

Dental status/Caries Recording Form

	R										L										
	18	17	16	15	14	13	12	11	61	62	63	64	65	21	22	23	24	25	26	27	28
o	8	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	8
m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38					
	85 84 83 82 81										71 72 73 74 75										

	Permanent	Primary
0	sound	A
1	decayed	B
2	filled & decayed	C
3	filled, no decay	D
4	missing due caries	E
5	missing, other reason	-
6	sealant	-
7	bridge abutment, crown	G
8	unerupted	-
9	excluded	-

DMFT: D 4 M 0 F 0 = 4

DMFS: D _____ M _____ F _____ = _____

Appendix E: pictures of dental decay, tooth missing and tooth filling



Dental decay



Tooth missing



Tooth filling

جامعة النجاح الوطنية

كلية الدراسات العليا

انتشار النخر السني في الأسنان الدائمة لأطفال المدارس البالغة أعمارهم
12 سنة في شمال الضفة الغربية

إعداد

براء ناجي مصطفى صبحة

إشراف

د. حسني مقبول

أ. د. محمود أبو موسى

قدمت هذه الأطروحة استكمالاً لمتطلبات درجة الماجستير في الصحة العامة بكلية
الدراسات العليا في جامعة النجاح الوطنية في نابلس، فلسطين.

2007

ب

انتشار النخر السني في الأسنان الدائمة لأطفال المدارس البالغة أعمارهم

12 سنة في شمال الضفة الغربية

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الملخص

أجريت هذه الدراسة في شهر نيسان من العام 2007م بهدف تحديد مدى انتشار النخر السني في الأسنان الدائمة للأطفال البالغة أعمارهم 12 سنة عن طريق أخذ عينة عشوائية من طلاب وطالبات مدراس شمال الضفة الغربية، فلسطين. ومن أجل الحصول على هذه النتيجة، تم اعتماد دليل شائع وهو معدل انتشار النخر السني، والذي يعني بتسجيل معدل الأسنان المنخورة والمقلوعة والمحشوّه. ومن أجل تقييم مستوى الرعاية السنية للأسنان المنخورة عن طريق علاجها بالحشوات المناسبة اعتمد دليل يدعى دليل العناية السنية، مرتكزين في مسحنا السني على الوسائل المعتمدة من قبل منظمة الصحة العالمية. لقد تم إجراء الفحص السني على 357 طالب من كلا الجنسين، تبين أن نسبة انتشار النخر السني بينهم كانت مرتفعة وكانت تساوي 84% أي ما يساوي 300 طالب من حجم العينة، بينما في المقابل 16% من مجموع حجم العينة هم أطفال غير مصابون أو لم يصابوا من قبل بنخر سني. أما معدل انتشار النخر السني فقد وجد عند الإناث أعلى منه عند الذكور حيث بلغت القيمة عند الإناث 3.94 وعند الذكور 3.04 أي بمعدل 3.45 عند كلا الجنسين. أما نسبة العناية السنية عند كلا الجنسين كانت منخفضة (6.7%) فكانت لدى الذكور (7.5%) ولدى الإناث (5.8%). ولقد حددت عدة عوامل تعيق هؤلاء الأطفال من الحصول على عناية فموية كاملة وبالتالي الصحة الفموية الجيدة، ومنها الكلفة العالية للإجراءات العلاجية السنية والضعف في إنشاء وتطبيق برامج الصحة الفموية المدرسية، بالإضافة إلى العقبات الناجمة عن وجود الاحتلال الإسرائيلي. وللحصول على صحة فموية أفضل لدى هؤلاء الأطفال لابد من تحسين تلك البرامج الصحية والتركيز على حملات التثقيف السني والإجراءات الوقائية مثل تطبيق الفلورايد والمادة السادة اللاصقة.