

AMERICAN UNIVERSITY OF ARMENIA
College of Health Sciences
MASTER of PUBLIC HEALTH PROGRAM



**COMMUNITY SERVICE GRANT PROPOSAL
FOR DENTAL HEALTH EDUCATIONAL
PROGRAM AMONG MOTHERS OF THE
CHILDREN AGED 2-6 YEARS OLD IN THE
DAVIDASHEN HAMAİK (DISTRICT) OF
YEREVAN**

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YEREVAN 99

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*“An ounce of prevention is worth a pound of cure”
Benjamin Franklin*

EXECUTIVE SUMMARY

Dental caries is a preventable multi-factorial disease associated with considerable morbidity and costs [1,2].

The problem of dental caries is one of the crucial issues all over the world. The disease is common world-wide, more than 98 % of people all over the world is suffering from dental caries [3]. It was estimated that the average schoolchild in the US has at least one cavity in permanent teeth by age 9 and three cavities by age 12 [4].

Generally, tooth decay and gum diseases are among the most widespread conditions that affect human population and are most frequently found in the children [5].

Dental health education is an essential strategy to improve oral health and obviously, the best time to begin care for the teeth is in early childhood. An exposure to basic principles of healthy habits in the early years will allow building a healthy and well-rounded lifestyle in future as an adult [5].

This paper proposes to develop, conduct and evaluate dental health education classes among parents (mothers) of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan. The goals of the dental health education classes are:

- Increase dental health related knowledge of the parents (mothers) of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan;
- Improve children's behaviour related dental health;
- Reduce the prevalence of dental caries, that is dmft (decayed, missing, filled teeth) index among the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan.

The duration of this program is 3 years (January 1, 2000 to January 1, 2003), and the program will include five main phases according the design.

- Phase 1 Pre-intervention (baseline data collection)

Rationale: to conduct "needs assessment" for the parents (mothers) of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan.

Additionally, the oral examinations will be carried out according to the

methodology of the World Health Organisation and initial DMFT indices of the children aged 2-6 will be measured.

- Phase 2 Program Development & Implementation (Intervention phase)

Rationale: to design a curriculum for dental health education classes among mothers of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan and to design implementation plan to launch this program.

- Phase 3 Program Evaluation I (post-intervention level I)

Dependent variable to be measured: dental health related knowledge of the parents of the children aged 2-6 years old;

Design: Quasi-experimental, the pretest-posttest control group design.

Dependent variable to be measured: children's behaviour related dental health.

Design: Quasi-experimental, the pretest-posttest control group design.

- Phase 4: Program Reinforcement

The literature indicates importance and integrity of reinforcement for dental health education [4,25].

- Phase 5: Program Evaluation II (post-intervention level II)

Dependent variable to be measured: prevalence of dental caries, i.e. dmft index.

Design: Quasi-experimental, the pretest-posttest control group design.

Study population

Intervention group: parents who live in the Davidashen Hamaik (District) of Yerevan, who have child aged 2-6 years old and registered at the Davidashen's Paediatric Polyclinic # 20.

Non-intervention group: parents who live in the Davidashen Hamaik (District) of Yerevan, who have child aged 2-6 years old and registered at the Davidashen's Paediatric Polyclinic # 20.

Estimated sample size: 50 mothers per intervention and non-intervention groups.

Total budget: US\$34,782.

SPECIFIC AIMS/OBJECTIVES

This paper proposes to develop, conduct and evaluate dental health education classes among parents of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan. The goals of the dental health education classes are:

- Increase dental health related knowledge of the parents of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan;
- Improve children's behaviour related dental health;
- Reduce the prevalence of dental caries, that is dmft (decayed, missing, filled teeth) index among the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan.

The main goals of this education program are:

- Increase dental health related knowledge of the parents of the children aged 2-6 years old;
- Change children's behaviour towards more dental health oriented;
- Reduce prevalence of dental caries (dmft) among the children aged 2-6 years old.

The objectives of the proposed program are:

Impact Objective: at the end of 4-week dental health education classes the mean difference of pre-post knowledge score (d_{inter}) in the intervention group, who take education classes will be at least 13% higher compared to the mean difference of pre-post knowledge score ($d_{noninter}$) in the non-intervention group, who do not take education classes.

Impact Objective: after conducting 4-week dental health education classes the proportion of mothers reporting change in the dental health behaviour of their children in the intervention group will be on 25 % higher, compared with the proportion of parents reporting change in the dental health behaviour of their children in the non-intervention group.

Outcome Objective: after conducting 4-weeks dental health education classes among mothers of the children aged 2-6 years, the prevalence of dental caries (mean dmft index) in the intervention group will be at least on 15% less, compared with the prevalence of dental caries (mean dmft index) in the non-intervention group.

INTRODUCTION

Children's Dental Health in the World

Dental caries is a preventable multi-factorial disease associated with considerable morbidity and costs [1,2].

The problem of dental caries is one of the crucial issues all over the world. The disease is common world-wide, more than 98 % of people all over the world is suffering from dental caries [3]. It was estimated that the average schoolchild in the US has at least one cavity in permanent teeth by age 9 and three cavities by age 12 [4].

Generally, tooth decay and gum diseases are among the most widespread conditions that affect human population and are most frequently found in the children [5].

The importance of dental caries in public health and preventive dentistry is underlined by the following reasons:

- First of all, dental caries has universal prevalence, rarely if ever does anyone go unaffected by dental caries and indeed most people are affected by dental caries during their lifetimes.
- Secondly, dental caries does not undergo remission or termination, if left untreated, moreover it accumulates a backlog of unmet needs and can ultimately ends in loss of teeth.
- Thirdly, untreated dental caries can lead to infection in the pulp and an infection that can spread to the supporting tissues and the jaws, with or without pain to the individual [1,6].

The formation of paediatric stomatology (from Latin “stoma”- mouth and “logia”- study) comes from the ancient times of the history of human population. Interesting information concerning eruption of teeth can be found in the works of Hippocrate (460-372 B.C.). Particularly, in one of the chapters he describes the symptoms, which can be seen during teeth's eruption. In A.D. 98-372 Soran Effesko, who was the first paediatrician of Rome, gives meticulous description of the process of teeth's eruption [7].

One of the important parts of this discipline is preventive paediatric stomatology or dentistry, which aims to prevent and control oral diseases [7].

Evidence available since the mid 1970s that oral health promotion and disease prevention services implemented in industrialised countries beginning

in the 1940s have shown dramatic effect on disease levels, particularly in children [6].

Dental health education is an essential strategy to improve oral health and obviously, the best time to begin care for the teeth is in early childhood. An exposure to basic principals of healthy habits in the early years will allow building a healthy and well-rounded lifestyle in future as an adult [5].

The conception of dental health education is presently widely spread and for the most of the century has been considered as an important and crucial part of dental health services [8]. The education activities itself are delivered to individuals and groups at various settings: schools [9,10,11], dental health centres or dental health clinics [12,13,14], maternity centres and care for small children [15] and workplace [16]. To increase public knowledge and awareness concerning fluoridation and increase its acceptance mass media campaigns has been utilised [15,17].

Kay E. J. and Locker D. reviewed 143 papers (randomized controlled trials) concerning dental health education interventions, which were published between 1982 and 1994. Two independent researchers according to twenty predetermined validity criteria scored the papers. Following the process of validation 37 papers out of initial 143 were retained and a quantitative meta-analysis was undertaken to summarise findings of those studies. All 14 (out of 37) papers which had been focusing on knowledge and attitudes showed positive effects, that is knowledge and attitudes could be improved through dental health education programs. Fifteen papers aiming to reduce plaque levels and improve gingival health had been included and 8 of them showed positive effect, whereas 7 did not show any effect, i.e. they were sometimes successful and sometimes not. The few studies relating dental caries showed no reductions in caries increments among the intervention groups, although the studies which had included additional interventions such as fluoride supplements or toothpaste, were not included in a meta-analysis of dental health education. Finally, the four studies examining dietary change displayed equivocal results, possible explanation for such kind of obscure could be lack of objective outcome measures [18].

According to the current health promotion concepts the interventions at the national and community levels are of more importance for enabling and mitigating behavioural change in society than interventions carried out at the individual level [19].

A study was conducted to reveal how oral health education conducted in Finnish health centres. The data for this study were collected through questionnaire, which had been sent to all Finnish health centres (n=215), except for the Island of Ahvenanmaa. The results showed that the majority of the full-time health educators (64%) who gave individual oral health (OHE) education were dental hygienists, more than 80% of full-time health-educators giving OHE in groups were dental assistance. A usual type of school lesson or a lesson where the audience was questioned was the most common methods utilised in OHE. Other creative methods of education such as panel discussions (3%), role models (3%) use of schoolbooks (6%), guest lectures (3%) and use of computers were very infrequent. The topics covered during the OHE classes by the majority of health centre professionals were: cleaning of the mouth (96%), and frequency of using sugar (96%), xylitol (96%) and fluorides (95%)[12].

A primary preventive dental health programme was implemented in non-fluoridated areas of Victoria, Australia. The main objective was to determine the efficacy and effectiveness of the programme. Five secondary colleges in two non-fluoridated regions of Victoria, Australia, were selected and 522 (256 acted as an intervention group and 266 performed as controls) subjects aged 12-13 years, considered at high risk of developing dental caries were recruited from them. The intervention group received the preventive programme which consisted of a weekly fluoride mouthrinse (0.2% neutral NaF), an annual application, replacement or repair of pit and fissure sealant, and an annual oral hygiene education programme, whereas the control group received the baseline and annual examinations, and annual oral hygiene education sessions only. After completing the three-year preventive programme subjects in the intervention group contracted an average of 1.49 fewer decayed, missing or filled tooth surfaces than the control group. Statistically significantly more control subjects experienced an increment in caries compared with the intervention group ($\chi^2 = 31.47$; $P < 0.001$)[10].

Another interesting school based oral health educational program was launched in 1990, in the city of Pori, Finland. Three secondary schools were included in the program and in each school was adopted only one of three different methods. In first school, a dentist gave the traditional oral health education (OHE) in a form of 45-min lecture with transparencies and slides. Second school was involved in the peer OHE consisted of a lecture given by

six pupils from the upper grades. Audio-video material (transparencies, slides and films) and professional assistance were provided by the health centre dentist, however the actual material used was selected by the pupils. Finally, in the third school the self-teaching method was carried out based on an exhibition from which the pupils searched for the information themselves. After the program's completion the pupil's opinions about the method itself, its content and implementation, knowledge about certain oral health issues, and the possible effect of the method were determined by a questionnaire. The results showed that the attitudes and opinions were most positive in the peer OHE group, the traditional OHE was quite well accepted and the self-teaching method was not very successful [11].

Parents play a significant role in the Paedodontic (Paediatric) Treatment Triangle (see Appendix, Fig. 1). From their offspring's day of birth parents form children's behaviour, selectively encouraging and discouraging particular behaviour. As the ones, who are most closely acquainted with their children's interests, concerns and desires parents are valuable resources. Without parental participation a job of dental professionals is more difficult and less productive. Thus, those dental services are most effective with the parent acting as an active member of guiding team [20].

Literature shows that mothers play crucial role in evolution of dental health behaviour of their pre-school offspring [21,22].

Since the end of the 1960s in Sweden at the child health centres all parents of young children have been involved in the dental health education program. The educational sessions have been given on one or two occasions from when the child reaches 6 months up until 2 years old. The aim of the program has been to improve oral hygiene habits, increase the use of fluorides and decrease sugar consumption. The dental health of young children improved notably during the 1970s and dental caries transformed from a disease that affected almost every child to a disease that affected only a part of the population [14].

In 1993 the Norwegian Longitudinal Health Behaviour Study was initiated to investigate the effect of parental dental health behaviour on that of their adolescent child, particularly with regard to the use of dental floss, use of toothpicks, tooth brushing, consumption of non-sugared mineral water, and consumption of sugared mineral water. In the County of Hordaland in Norway separate questionnaires for parents and a 16-year-old child in 436 family units

were distributed through mail. Logistic regression was carried out to analyse relationships between the dental health behaviours of parents and their adolescent offspring. The study showed statistically significant ($P < 0.05$) association between the dental health behaviours of parents and their adolescent offspring at least with regard to use of dental floss, tooth brushing, and consumption of non-sugared mineral water [23].

In 1995 in an inner city Latino in Washington DC an oral survey of a convenience sample ($n=142$) of children aged 2-5 years old and survey of the knowledge, opinions and practices (KOP) of their parents ($n=121$) were completed, to collect baseline data prior to initiating a community-based, oral health education program. Only 53% of the children were caries free, 18% of all children needed in immediate dental care and 26% were in need of early or non-urgent dental care. Only 7% of the parents knew the purpose of sealant and 52% knew the purpose of fluorides, moreover, only 9% thought that brushing can prevent tooth decay. The study showed that the strongest predictors of dental caries in this population were freshness of mother's residence in the United States and report of an uncooperative child when attempting tooth-brushing [24].

The important point that should be kept in mind is that the dental caries is bacterial in origin, intensified by dietary sugars and, ineffective plaque removal and less than optimal fluoride availability. Therefore, a restorative approach will have only extenuating effect and cannot solve the problems of dental disease, whereas prevention is the key factor for solving this problem [25].

Thus, literature proves, that available community and individual strategies, if fully implemented and maintained, can reduce dental caries in society and clearly, the best time to begin care for the teeth is in early childhood [5,6].

Children's Dental Health in Armenia

From 1970 until 1977 in Armenia, predominantly in big cities like Yerevan, Leninakan (nowadays Gumri) and Kirovakan (nowadays Vanadzor) carried out planned sanitation¹ form Russian "planovaya sanatia". The main aims of the planned sanitation were early detection and treatment of mouth cavity diseases.

Thus, sanitation was mean of secondary prevention, since the main purpose was treatment and prevention of further complication [27].

Starting from 1977 in Yerevan was launched "dispanserizatia", i.e. systematic clinical examination of children with regard to the level of severity of dental caries. The children were under systematic and permanent observation or control of paediatric dentists. Preliminarily, main dental caries indices and hygiene indices of children were determined [27].

There were implemented the following preventive activities: mouth rinsing with 0.2% neutral NaF, sealing of pits, applications using fluoride varnish and provision of fluoride tablets. With the permission of Municipality Department of People's Education in the schedule of schools was included so-called "hour of hygiene", where children were taught correct technique of toothbrushing. The results of the hygiene fostering were evaluated according to Hygiene Index of Fedorov-Volodkinoi. This Hygiene Index in 1988 was estimated as less than 2, whereas in 1977 it accounted for 4.5[27].

First data concerning morbidity of dental caries showed that in 1976 DMF Index among children aged 12 years in Yerevan was 4.5, whereas in 1988 it diminished and was 1.8[27].

According to the Ministry of Health of Armenia in 1995 the following prevalence of oral diseases rates in the population was highlighted: 42% with dental caries; and 25% with periodontal disease. By the age of five years old, the average Armenian child had three decayed and/or filled primary teeth, i.e. dft index was estimated as dft=3. By the age of 15 years the average DMFT was approximately 3.8-5.6[28].

As consequence of collapsed socio-economic situation in Armenia starting from 1992-1993 academic years the situation with dental health of children worsened. There were closed all children's stomatological services in paediatric sanatoria (health centres) and it became impossible to maintain summer sanitation of children at the summer camps [29].

In 1993-1994 academic years started close stomatological services in the schools and finally in 1995 decentralised planned sanitation ceased to work (see Table 1 beneath).

¹ Sanitation is the system of active, therapeutic-preventive stomatological (dental) services provided to habitants, which aims to treat diseases of mouth cavity and avert complication [26].

Significantly has increased prevalence of dental caries among children. If in 1988 the DMF index of 12-year children was estimated as 1.8, in 1998 it enhanced and become 2.6[29].

However, in 1993 with assistance of Karagozian Charitable Fund in Nork-Marash Hamaik (District) of Yerevan has been established charitable paediatric stomatological policlinic. Later on, similar policlinics have been opened in Malatia-Sebastia Hamaik (District) of Yerevan and in other regions of Armenia [29].

Table1: The Structure of Stomatological Services in Armenia, 1990-1997

Facility	1990	1991	1997
Independent Child Stomatology Polyclinics	10	10	11
Child Stomatology Stationary Departments (in Hospitals)	1	1	2
Child Stomatology Departments in Polyclinics	1	1	5
Child Orthodontic Service	10	10	11
Child Stomatology Rooms in Medical Institutions	29	32	22
Stationary Stomatology Service in Schools and Kindergartens	223	210	5
Independent Child Dental Clinics (Karagosian Fund-not in the Ministry of Health Structure)	0	0	4
Total	274	264	60

Data Source: Ministry of Health, RoA, 1998

In 1995 as study was undertaken to determine fluoride ion levels in the drinking water of Yerevan. For this purpose 39 randomly selected water samples in 1995 and 64 samples in 1996 were chosen and analysed. The results showed that the fluoride concentration identified in samples in 1995 as well as in 1996 were below the GOST (the state methods and standards for the former USSR which have been adopted by Armenia), the US EPA (United States Environmental Protection Agency), and the WHO recommended optimal levels for community drinking water (0.7 to 1.5 mg/l, 0.8 to 1.2 mg/l, and 1.5 mg/l, respectively)[30].

In 1997 a group of researchers initiated a study aimed to develop cultural appropriate and effective for Armenia dental health education material. The qualitative methodology utilised by this study allowed

developing dental health education material a booklet “Bklik’s Walk” for the age 4-7 year old schoolchildren in the Republic of Armenia. From 1997 till present more than 20,000 copies of this booklet have been distributed all over Armenia and in the Yerevan² as well. In Yerevan, the booklet is mainly being distributed at the kindergartens, schools, and orphanage [36].

Recently there was conducted the situation analysis of Women and Children in Armenia by the Government of Armenia, UNICEF, and Save the Children and following problems concerning oral health were highlighted:

- Low public expenditures on children’s oral health - under the Basic Benefit Package (BBP), in 1998 the government would pay only for two dental appraisements, the first at the age six and the second at the age 12 years. In 1999 the government again will pay for two assessments, but the first at the age seven and the second at the age 12 years (Ministry of Health, RoA, Order 244, April 30, 1999). Thus, the government’s possibilities for supporting dental health care of children are limited.
- High rate of dental caries morbidity among children (0 -14 years), in 1997 out of 147,429 children (17.0 %) all over Armenia who had been examined, 78,889 or 53.5 % were needing treatment. In 1998 out of 49508 children in Yerevan (22%) who had been examined 18829 or 58% needed treatment (See Appendix Tables 2 and 3). The majority of children have already developed caries by the age of six, therefore it is insufficient to have just two assessments throughout the period from 0 to 14 years.
- Inappropriate, cariogenetic diet of Armenian children.
- Lack of parent’s knowledge about oral health and hygiene - the majority of the parents belief that temporary (baby) teeth do not need to be brushed.
- Dental care is almost completely privatised and expensive, whereas an overall quality and use of services is diminished.
- In 1994 all school and kindergarten stomatological services were closed.
- Low access of children to dental care, since 1990 there is significant decrease in the number of children assessed - in 1990 56.5 % of all children were examined and in 1997 this indicator dropped sharply to 17.0 %. In general, half of the children assessed have needed treatment and if we assume that the same proportion exists for children who are not examined, it

² The booklet have not been distributed at the Davidashen Hamaik (District) of Yerevan.

will mean that the large proportion of children need treatment, but have no access to it [31].

Community of interest.

Davidashen Hamaik (District) of Yerevan is located on the Northwest part of the city. Previously Yerevan was divided on 8 districts and Davidashen part of the Mashtots' district. In 1996 administrative division of Yerevan has been changed from Districts to Hamaiks and Davidashen has been separated from the Mashtots District and became an autonomous and individual Hamaik.

The peculiarities of Davidashen Hamaik of Yerevan are the following (see Appendix Figure 2):

- The total population is 50,800 people and size is 671 ha.
- Davidashen Hamaik is relatively new built area, which is settled mostly by the habitants with low socio-economic status.
- Total number of families is 6548.
- Total number of children aged 2-6 years old (that is the target population of the program) is 1790.
- In the Davidashen Hamaik (District) there are 5 kindergartens. Total number of children attending these kindergartens is 935, out of which 95 are children under 3 years old; 403 are children aged 3 – 6 years old; 210 are children aged 6 years old and 227 are children aged 7 years old.
- There are one Children's Stomatology Policlinics # 5, and one Paediatric Polyclinic 20, which serve all Davidashen's Hamaik (District)[32].

Appraisal of different strategies to address the problem.

So, literature clearly indicates that dental diseases, particularly dental caries are among the most prevalent, and at the same time most preventable chronic health problems not only in the world but in Armenia as well [30].

One way of dealing with the problem is a restorative approach, that is conservative and individual scheme of treating the dental diseases. However, this approach will just soften a severity of problem by eliminating the consequence or complication of the dental diseases, without exterminating the aetiology or cause of the dental diseases. Moreover, dental services in Armenia

are insufficient to cope with the high rates of the dental diseases. Thus, the key mechanism and the only realistic way of improving dental health are through prevention [25,30].

Clearly the best time to begin care for the teeth is in early childhood, since an exposure to basic principles of healthy habits in the early years will allow building a healthy and well-rounded lifestyle in future as an adult [5].

In Armenia the only dental professions available are dentists and dental nurses, who are mostly oriented towards curative treatment, whereas in western countries there are dental hygienists and dental therapists who are mostly emphasising on preventive care. As consequence of the absence of dental hygienists and dental therapists in Armenia there is lack of access to appropriate preventive procedures, such as sealant, fluoride gels and other professionally practiced preventive agents [30].

Community water fluoridation still being considered as the most effective and socially equitable central tool for dental caries prevention [33]. Taking into account that the fluoride concentration in water in Yerevan is insufficient for caries prevention, one of the central strategies for addressing the problem of dental caries could be community water fluoridation.

However, on the way of implementing of this strategy two big obstacles will arise:

- First of all, water distribution network in Yerevan is obsolete and in very poor condition. Despite the fact that in 1998 the International Development Association allocated loan for approximately \$30 million for the improvement of Yerevan's water system and water supply management, according to the Ministry of Economy and Finance significantly more money (on the order of \$450 million) is needed to completely renovate the water-sewage system in Yerevan [31].
- Secondly, as it has been indicated earlier there is lack of knowledge among parents concerning oral health and hygiene [31]. Whereas it is well known that the community awareness and support is crucial for the introduction of water fluoridation [25,30].

Another strategy that could be implied to address the problem of dental caries among the children is different preventive and prophylactic activities, such as dental health education, provision of topical fluoride (varnishes, gels tablets etc.) implemented in the kindergartens and schools.

Nevertheless, after the collapse of the USSR, the new realities of post Soviet Armenia makes difficult to launch and maintain these kind of preventive and prophylactic activities. In 1994 all school and kindergarten stomatological services were closed. The attendance rate in the kindergartens diminished sharply, in the Davidashen Hamaik of Yerevan only 35.55% of children under 6 years old visits kindergartens [32].

Moreover, the possibilities of government to support any kind of preventive dental health strategies are limited. The only thing that government can afford is reimbursement for two dental assessments, the first at the age seven and the second at the age 12 years (Ministry of Health, RoA, Order 244, April 30, 1999)[31,32].

Recommendation for a course of action, including the rationale used to make this decision

Because of the high concentration of the population in the Yerevan, this city is the primary target for the public health programs[32].

This paper proposes to develop, conduct and evaluate dental health education classes among parents of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan. The goals of the dental health education classes are:

- Increase dental health related knowledge of the parents of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan;
- Improve children's behaviour related dental health;
- Reduce the prevalence of dental caries, that is DMF (Decayed, Missing, and Filled teeth) index among the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan.

The reason and at the same time an advantage for choosing this Hamaik (District) have been dictated based on the following factors and assumptions.

1. First of all the Davidashen Hamaik is relatively newly built district of Yerevan settled by the habitants from different parts of Yerevan, that is, it could be assumed, that the population of the Davidashen Hamaik (District) is pretty representative of that of Yerevan.
2. Secondly, the Hamaik is pretty compact with high concentration of habitants, the area of 671 ha is settled by 50,800 people.
3. Thirdly, the Hamaik is located in the accessible part of Yerevan with good developed network of transportation within and out of the Hamaik [32].

Parents play a significant role in the fostering of healthy dental behaviour of their offspring and in the so-called Paedodontic (Paediatric) Treatment Triangle (see Appendix, Fig. 1). The crucial and vital part in evolution of dental health behaviour of their pre-school offspring pertains to the mothers [20-22]. The same situation persists in Armenia. The Armenian woman traditionally had an accessory role in the family and in society. These traditions have not lost their actuality even today and women in Armenia still bear the burden of assuring the functioning of the family, educating and caring for the children and the household [34].

That is why the main emphasising of this program will be on the educating of the mothers of the children aged 2 through 6 years old.

The importance of this age interval is underlined by the facts that at the age of 2-2.5 years most children have all their “baby” teeth or primary teeth, 10 primary in the upper jaw and 10 in the lower jaw. The “baby” or milk teeth play an important role for the proper chewing of food, forming of words and appearance. Indispensable the role of the milk teeth for the growth of the jaw and in the development of the permanent teeth.

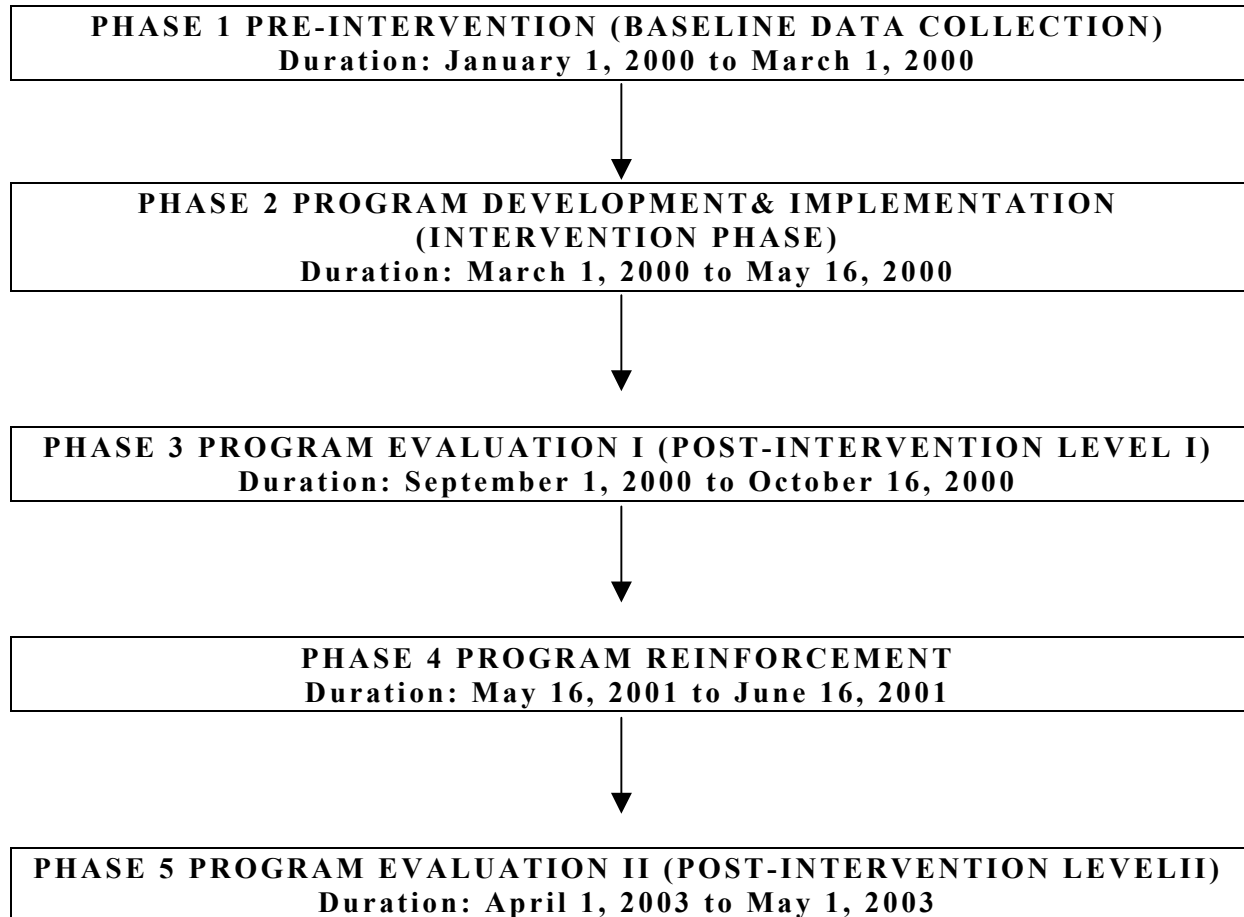
At the age of six years starts shedding of the primary teeth and eruption of the permanent teeth. Here essential the role of first molars or so-called “six-year molars”. The important point is that the six-year molar does not replace a tooth, but erupts behind all the milk teeth. That is why the six-year molars should be cared for and cleaned regularly [3,5,35].

Thus, this paper proposing to improve dental health related behavior of the children aged 2-6 years old in the Davidashen Hamaik of Yerevan and address the problem of dental caries among this children through educating main caretakers that is mothers and enhancing the knowledge of the mothers concerning dental health.

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METHODOLOGY

The proposing dental health education program will include five main phases according the following design:



Phase 1: Pre-intervention (baseline data collection)

Rationale: to conduct “needs assessment” for the mothers of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan, in order to collect baseline data and have more detailed information about baseline situation in this particular area of Yerevan. Additionally, the oral examinations will be carried out according to the methodology of the World Health Organisation and initial dmft indices of the children aged 2-6 will be measured.

Measurement instrument: personal interviews.

The reason of choosing particularly this measurement instrument comes from the peculiarities of the Davidashen Hamaik and advantages of the method. The method will allow have high level of response rate, as well as

more accuracy in selecting the respondents. Indisputable the fact that personal interviews will give opportunity to have questionnaires of longer length and to control the sequence of response to questions [37].

In contrast the telephone interviews do not have high response rate, can not handle complex and open-ended questions [37]. Besides in whole Davidashen Hamaik only 30% of households have telephones [38].

The phase itself will consist of three sub-phases:

1. Development of questionnaires - formulating and formatting the research questions; pre-testing with subsequent revision of questions and finalising of the ultimate version of questionnaire.

The questionnaires itself will include the following parts: introduction, with description of the program's aim, name of the future sponsor organisation and certainly with part assuring confidentiality and anonymity patterns. Then there will be demographic questions concerning age, education of the mothers and household composition of their families. The rest part of the questionnaires will include questions concerning knowledge of the mothers about dental health (periods of teeth eruption; dental caries aetiology; cariogenic and anticariogenic diet; the role of fluoride in the caries prevention and other preventive tools such pit sealant, tooth brushing etc.) and questions revealing dental health behaviour of their children.

Knowledge score will be constructed and will become the primary dependent variable for each study participant. The knowledge score will be treated as continuous variable and will reflect the proportion of correct answers to total knowledge questions.

Additionally, the questionnaires will include questions concerning the participation in other dental health educational programs, to control possible confounding factors and also questions for further developing curriculum of future dental health educational classes (what is appropriate time for them? what days of week are most suitable for them? etc.).

2. Training of Interviewers - very important part, which will allow to control and prevent possible interviewer error (bias). The literature shows that at least two days of training should be devoted for the interviewer [37].

Centre for Health Services Research (CHSR) staff at the American University of Armenia will conduct training sessions.

3. Data collection – personal interviews and door to door survey will be carried out. Taking into account the fact that the interviewees are mothers during recruitment of interviewers preferences will be given to females. Though this kind of matching is important only for sensitive topics. The recruitment will be conducted from students of Public Health Program at the American University of Armenia. The interviewers will be supplied with exact home addresses of the mothers of the children aged 2-6 years old, this information is available at the Davidashen's Paediatric Polyclinic # 20. Additionally the interviewers will be provided with questionnaires, consent forms for the mothers and reminders for oral examination of their children. The reminders will include announcement for oral examination of the children with citing exact time and place of the examination and with emphasise that the examination is free of charge. Bearing in mind that dental care is almost completely privatised and expensive and low access of children to dental care high rate of participation and answers to the reminders is anticipated.

Precise plan and schedule for the future oral examinations will be designed to have smooth and logistic flow from the personal interviews to the oral examinations. Oral check-ups will be carried out at the Davidashen's Paediatric Polyclinic # 20. The mothers are familiar with this polyclinic since all children of the Davidashen Hamaik are registered here and mothers visit periodically the polyclinic for vaccination, for well childcare visits etc. The dentist will be hired to carry out oral examination and to measure DMFT indices according to the methodology of the World Health Organisation.

DMFT index describes the amount – the prevalence – of dental caries in an individual. The index is mean to numerically express the caries prevalence and is obtained by calculating the number of Decayed (D), Missing (M) and Filled (F) teeth (T). For the primary dentition consisting of maximum 20 teeth, the corresponding designation for DMFT index is “deft”, where “e” indicates “extracted tooth”[39].

Duration: January 1 to March 1, 2000

Phase 2: Program Development & Implementation (Intervention phase)

Rationale: to design a curriculum for dental health education classes among parents (mothers) of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan; to design implementation plan to launch this program.

The Health Education Authority identified four main oral health messages, which are simple and can be applied to have a measurable health gain [40]:

1. Reduce the consumption, especially the frequency of intake of sugar-containing food and drink.
2. Clean the teeth and gums thoroughly every day with a fluoride tooth paste.
3. Seek dental advice and early treatment on a regular basis.
4. Support water fluoridation – the main aim is to support an idea of water fluoridation rather than to change the behaviour.

Thus, during the education classes the following major topics will be covered:

- Anatomic background regarding mouth cavity including periods of primary and permanent teeth eruption.
- Dental Caries – aetiology, pathogenesis and risk factors for disease development.
- Cariogenic and anticariogenic diet.
- How to prevent dental caries – value of fluorides, dental sealant, tooth brushing and flossing.

The education classes will be conducted at the Davidashen's Paediatric Polyclinic # 20. The duration of the education classes will be 4 week and 3 classes per week will be conducted. Each class will last from one to one and half of hours and total 12 classes will take place.

The first version of the education classes curriculum is presented at the appendix (see Appendix Figure 3).

The training of trainer sessions will precede the education classes and the trainers' team will include a dentist and an assistant (student of the Public Health program preferably with dental background).

Literature shows that the educational programs aimed to reduce dental caries should include the use of fluoride product [25]. That is why as a part of intervention the education classes will include distribution of fluoride toothpaste among the mothers. Additionally, as incentives for participation in the program toothbrushes and dental flosses will be distributed as well.

Duration: March 1, 2000 to May 16, 2000.

Phase 3: Program Evaluation I (post-intervention level I)

The program evaluation will include two phases: phase 3 and phase 5 (see beneath).

The phase 3 will cover evaluation only two of the three dependent variables: knowledge score and children's behaviour. Three months after completing educational classes the same questionnaires will be distributed among the mothers and personal interviews will be carried out. The same interviewers will be hired to conduct personal interviews, however two days of training of trainers will precede the personal interviews.

Dependent variables to be measured:

- dental health related knowledge of the parents (mothers) of the children aged 2-6 years old;
- Children's behaviour related dental health.

Duration: September 1, 2000 to October 16, 2000.

Phase 5: Program Evaluation II (post-intervention level II)

Three years after completing educational classes the third dependent variable, prevalence of dental caries (dmft index) will be measured. Literature shows that period of three years is the reasonable interim needed for dental caries to develop [9,10].

Dependent variable to be measured:

- Prevalence of dental caries, i.e. dmft index.

Duration: April 1, 2003 to May 1, 2003.

Phase 4: Program Reinforcement

The literature indicates importance and integrity of reinforcement for dental health education [4,25]. That is why 1.5 years after completing educational classes the reinforcement sessions will be organised. The same-trained dentist and the assistant will conduct the sessions. Duration of the sessions will be one week and the classes' structure will be based on the mothers' questions and main emphasise will be put on preventive means and tools.

Duration: May 16, 2001 to June 16, 2001.

Evaluation Design

Variables:

- Dental health related knowledge of the mothers of the children aged 2-6 years old;
- Children's behaviour related dental health.
- Prevalence of dental caries, i.e. dmft index

Design: Quasi-experimental, the pretest-posttest with non-intervention group design.

Pictorial Representation:	R	O₁	X₁	O₂	X₂	O₃
	R	O₁		O₂		O₃

O₁ – baseline data collection in the intervention group and non-intervention group (*Duration:* January 1 to March 1, 2000)

X₁ – intervention (Education Classes. *Duration:* March 1, 2000 to May 16, 2000)

X₂ – program reinforcement (*Duration:* May 16, 2001 to June 16, 2001)

O₂ – post-intervention data collection first stage. Only two dependent variables will be measured: parental knowledge and children's behaviour (*Duration:* September 1, 2000 to October 16, 2000).

O₃ - post-intervention data collection second stage. Three years later from the beginning of the program the third variable DMF index or prevalence of dental caries will be measured (*Duration:* April 1, 2003 to May 1, 2003).

Sample Size

For each program objective sample size will be estimated separately and the biggest one will be chosen.

Impact Objective: at the end of 4-week dental health education classes the mean difference of pre-post knowledge score (d_{interv}) in the intervention group, who take education classes will be at least 13% higher compared to the mean difference of pre-post knowledge score ($d_{\text{noninterv}}$) in the non-intervention group, who do not take education classes.

To determine sample size for two independent samples, whose mean values are to be compared the following formula will be used:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2 (2)\sigma^2}{\Delta^2}$$

Where:

$Z_{1-\alpha} = 1.64$, assuming that $\alpha = 0.05$; We are interested in the change of mothers' knowledge only towards one direction, increase, that is why our assumption is based on the usage of one-sided test.

$Z_{1-\beta} = 0.84$, assuming that $\beta = 0.2$, i.e. power is 80%.

$\Delta = (d_{\text{interv}} - d_{\text{noninterv}}) = 13$, assuming that our knowledge score is 100, anticipating 13% increase in the score will result in mean scores difference of $100 * 0.13$, or 13.

In November 1997 Centre for Health Services Research (AUA CHSR) conducted evaluation of a health education program which had been conducted in May 1997 for pregnant women, in Yerevan. Among the topics included in the program there was dental health education as well. Bearing in mind this fact and the fact that the target population of our study is mothers i.e. also women our assumption for anticipating improvement in the knowledge score will be based on the results of this study [41].

The results of this study showed improvement of the mean knowledge score in the intervention group about 11% higher compared with the non-intervention group. However, their intervention mainly consisted of distribution of educational booklet, whereas our program will include more in-depth and detailed intervention, education classes. That is why we are anticipating the difference of the mean knowledge score in the intervention at least 13% higher compared with the non-intervention group.

σ - standard deviation of the parameter. Again based on the results of the program described above we assume $\sigma = 12.5$, since our sample will be drawn from the same culture.

Therefore,

$$n = \frac{(1.64 + 0.84)^2 (2) (12.5)^2}{(13)^2} = 11$$

Impact Objective: after conducting 4-week dental health education classes the proportion of mothers reporting change in the dental health behaviour of their children in the intervention group will be on 25 % higher, compared with the proportion of parents reporting change in the dental health behaviour of their children in the non-intervention group.

Based on literature, which shows that mothers play crucial and vital role in the evolution of dental health behaviour of their pre-school offspring[20-22] and on the fact that the mothers will be highly motivated to prevent dental caries, since dental care is almost completely privatised and expensive (see situation analysis above) it is reasonable to anticipate 25% increase in the proportion of the mothers who report improvement of dental health behaviour of their children.

To determine sample size for two samples, whose proportions are to be compared the following formula will be used:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2 2(P)(q)}{\Delta^2}$$

Where:

$Z_{1-\alpha} = 1.64$, assuming that $\alpha = 0.05$; We are interested in the change of mothers' knowledge only towards one direction, increase, that is why our assumption is based on the usage of one-sided test.

$Z_{1-\beta} = 0.84$, assuming that $\beta = 0.2$, i.e. power is 80%.

$\Delta = 0.25$ (25%).

$P =$ assumed to be 0.5 to generate maximal sample size, since baseline proportion is not known.

$q = 1 - P = 0.5$.

Therefore,

$$n = \frac{(1.64 + 0.84)^2 2(0.5)(0.5)}{(0.25)^2} = 49$$

Outcome Objective: after conducting 4-weeks dental health education classes among mothers of the children aged 2-6 years, the prevalence of dental caries (mean dmft index) in the intervention group will be at least on 15% less, compared with the prevalence of dental caries (mean dmft index) in the non-intervention group.

Literature and dental health professionals indicate that this kind of education programs can result in reduction of prevalence of dental caries on 15% [6, 42].

To determine sample size for two independent samples, whose mean values are to be compared the following formula will be used:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2 (2)\sigma^2}{\Delta^2}$$

Where:

$Z_{1-\alpha} = 1.64$, assuming that $\alpha = 0.05$; We are interested in the change of mothers' knowledge only towards one direction, increase, that is why our assumption is based on the usage of one-sided test.

$Z_{1-\beta} = 0.84$, assuming that $\beta = 0.2$, i.e. power is 80%.

$\Delta = 0.15$ (15%)

σ - based on the results of similar dental health programs [9] the optimal estimate of standard deviation will allow to have large enough sample size for detecting anticipating difference is 0.3.

Therefore,

$$n = \frac{(1.64 + 0.84)^2 (2) (0.3)^2}{(0.15)^2} = 49$$

Thus, the biggest sample size estimated is $n=49$, rounding up we will need 50 mothers for intervention group and 50 for non-intervention group.

Sampling

Target Population: Mothers of the children aged 2-6 years old at the Davidashen Hamaik of Yerevan.

Sampling Frame: List of the children aged 2-6 years old, who are registered at the Davidashen's Paediatric Polyclinic # 20.

Sampling Element: mother of the child aged 2-6 years old, who are registered at the Davidashen's Paediatric Polyclinic # 20.

Intervention and Non-intervention Groups: Davidashen Hamaik itself is subdivided on 4 geographic districts (blocks). In order to control for possible dissemination of information between intervention and non-intervention groups, randomly one geographic district (block) will be assigned to intervention group and another one to non-intervention group.

Intervention Group: From the list of the children aged 2-6 years old, who are registered at the Davidashen's Paediatric Polyclinic # 20, using simple random sample our sample elements will be selected. Before selection procedure

researcher will make sure exclude from the list children who are form the same family (brothers and sisters of our sample elements) that is only one child form each family should be listed in the sample frame. Thus, the intervention group will include the mothers who live at one of the randomly chosen district (block) out of 4 districts (blocks) of Davidashen Hamaik and whose children are registered at the Davidashen's Paediatric Polyclinic # 20.

Non-intervention Groups: mothers who live at one of the randomly chosen district (block) out of 4 districts (blocks) of Davidashen Hamaik and whose children are registered at the Davidashen's Paediatric Polyclinic # 20.

Threats to Validity

Campbell and Stanley have facilitated the work of evaluators with the issue of causality by specifying the various threats to internal validity (did the program cause the outcome?) and external validity (how generalizable are the results of this program demonstration?)[43].

Internal Validity

History: will be controlled, since any "historical" change that will occur in the intervention group will take place in the non-intervention group as well.

Maturation: will be controlled, since any affecting change in maturation that will occur in the intervention group will take place in the non-intervention group as well.

Testing: according to Campbell and Stanley for this kind of evaluation design reactive effect of pre-test is controlled, however it is possible that the topics of pre-testing variables can interest the mothers and they may want to look at the literature.

Instrumentation: the testing instruments will be the same for pre and post intervention periods, besides the training sessions for interviewers will allow control the instrumentation bias.

Statistical Regression: Campbell and Stanley indicate that this potential threat is controlled for pre-post-test control group designs.

Selection Bias: both intervention and non-intervention groups will be selected using simple random sample, therefore the item will be controlled.

Attrition: controlled, since intervention and non-intervention groups have same likelihood of dropping out of the program.

External Validity

Testing-program interaction: controlled, since the program is not going to increase or decrease the target population's reactivity or sensitivity, besides for caries prevalence sensitivity of the mothers will not affect dmft index of their children.

Selection-treatment interaction: absent, because the Davidashen Hamaik is relatively new built area settled by habitants from different districts of Yerevan, therefore the outcomes of the program will not be relevant only to this population.

Reactive/Situational effects of experimental arrangements: may be source of concern, especially for mothers' knowledge and children's behaviour, when the aura of the program evaluation setting can affect the observed outcomes.

Multiple treatment effects: controlled since whatever will occur in the intervention group will take place in the non-intervention group as well.

BUDGET

The total time necessary to complete five phases of the program is about 3.5 years. The activities, which are going to occur throughout the proposed educational program, have budgetary implications, which need to be highlighted in the budget (see Appendix Table 3).

The proposed educational program is going to be implemented through the CHSR AUA. For this reason two persons will be hired from CHSR as permanent staff. The program co-ordinator (manager) and research assistant will be hired to supervise and maintain logistic flow of the program's phases, to develop all research materials (questionnaires, consent forms, reminders, etc.).

Main items of the expected budget for each phase are presented beneath:

Phase 1: Pre-intervention (baseline data collection)

To conduct personal interviews 5 interviewers will be hired from the students of Public Health Program at the AUA and preference will be given to females. Additionally, 3 dentists will be hired to conduct oral examinations. Assuming that each interviewer will complete 4 personal interviews per day, the interviewer team will finish surveying of 100 mothers in 5 days.

Assuming that each dentist will accomplish 10 oral check-ups per day, the oral examinations of 100 children will be completed in about 5 days as well.

At this phase anticipating budget will include expenditures on printing and Xeroxing of questionnaires, and forms for oral examinations. In order to avoid underestimation of the budget we will assume length of the questionnaires equal to 8 pages and examination forms equal to 2 pages.

Phase 2: Program Development & Implementation (Intervention phase)

Class Instructors: a dentist and an assistant(student of the Public Health program preferable with dental background) will be hired to conduct education classes among the mothers.

Educational materials, notebooks, pencils will be distributed among the mothers of the intervention group. Assuming 15 pages of educational materials (handouts) per week distributed among mothers, the expected expenditures will be calculated.

As part of the education classes it is planned to have demonstration of education films. For this purpose 4 education films for each week of classes will be purchased and VCR will be rented.

Additionally as part of the program's intervention fluoridated toothpastes will be distributed among the mothers in the intervention group only. At this stage each mother (child) in the intervention group will be supplied with 12 tubes of fluoridated toothpaste. This quantity will ensure usage of fluoridated toothpaste till the reinforcement of the program, assuming utilisation of 1 tube of toothpaste per month.

Also as incentives for participation at the program tooth brushes and dental flosses will be distributed among the mothers in the intervention group.

Phase 3: Program Evaluation I (post-intervention level I)

Again to conduct personal interviews 5 interviewers will be hired from the students of Public Health Program at the AUA and preference will be given to females. Assuming that each interviewer will complete 4 personal interviews per day, the interviewer team will finish surveying of 100 mothers in 5 days.

At this phase anticipating budget will include expenditures on printing and Xeroxing of questionnaires.

Phase 4: Program Reinforcement

Again the dentist and assistant (student of the Public Health program preferable with dental background) will be hired to conduct one-week reinforcement sessions among the mothers. After completing the reinforcement sessions each mother (child) in the intervention group will be supplied with 20 additional tubes of fluoridated tooth paste (Note: 10 tubes will be distributed on June 16, 2001, i.e. right after completing reinforcement sessions, whereas other 10 tubes will be disseminated one year later on June 16, 2002). This quantity will ensure usage of fluoridated toothpaste till the last phase of the program, assuming utilisation of 1 tube of toothpaste per month.

Phase 5: Program Evaluation II (post-intervention level II)

The dentists (3 persons) will be hired to conduct oral examinations. Assuming that each dentist will accomplish 10 oral check-ups per day, the oral examinations of 100 children will be completed in about 5 days as well.

At the end of whole program two tooth pastes, toothbrush and dental floss will be distributed among mothers, this time not only in the intervention group, but in the non-intervention group as well.

ETHICAL CONSIDERATIONS

The proposed dental health education program is free of using any harmful agents or methods for the mothers or their children. The purpose of this program is:

- Increase dental health related knowledge of the mothers.
- Improve children's behaviour related dental health.
- Reduce the prevalence of dental caries.

The methods of the research incorporated in the program are appropriate to the aims of the intervention and results from relevant previous and ongoing researches are taken into account in its design.

Several steps are undertaken to protect mothers during educational classes and children during oral examinations:

- First of all the classes will be held at the Davidashen's Paediatric Polyclinic # 20.
- Secondly, only professional dentists with extensive work experience will be hired to carry out oral examinations, besides the training sessions will precede the check-ups.

- Thirdly, specialists will conduct the educational sessions: trained dentist and trained assistant.
- Fourthly, all materials distributed among the mothers will be designed and formatted along with experts in this area, so that it will be ensured that they do not contain any harmful agents or methods.
- Fifthly, the participation in the education classes will be on the voluntary basis, i.e. any participants will be free to drop the classes at any moment.

The program anticipating to have two groups intervention and non-intervention. Since recruitment procedure will be carried out using simple random sampling technique all subjects within this particular community will have equal likelihood of being enrolled in the intervention or non-intervention group.

The important thing that should be emphasised is informed consents will be obtained from all participants of the program. Thus, assurance that all individuals involved understand as fully as possible the nature of the program, the reason it is being undertaken and the possible benefit to them and their community will be obtained.

Despite the fact that mainly the participants in the intervention group will be supplied with tooth pastes (as part of intervention) and tooth brushes, dental flosses (as incentives) at the end of the program mothers in the non-intervention group will be supplied with the toothpaste, toothbrushes and dental flosses as well.

And finally, even though the program does not contain any sensitive topics, the issues of confidentiality will be guaranteed for the participants.

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REFERENCES:

1. Dean T. Jamison, W. Henry Mosley, Anthony R. Measham, Jose Luis Bobadilla *Disease Control in Developing Countries*. Oxford University Press, pp. 647-658, 1993.
2. Levit KR, Freeland MS, Waldo DR, *National Health Care Spending Trends*. Health Affairs 9, pp. 171-184, 1990.
3. Yerevan State Medical University, Department of Therapeutic Stomatology. Yerevan 1996.
4. David C. Retford et al. *Guide to Clinical Preventive Services*. Second Edition, pp. 711-716, 1996.
5. Prof. Poul Erik Petersen, Dr. Lisa Boge Christensen, *Oral Health Promotion, Health Promoting Schools Project*. World Health Organization, 1995.
6. John M. Last, Robert B. Wallace, *Public Health & Preventive Medicine*. Appleton & Lange 13th edition, pp. 1005-1012, 1992.
7. Kolesov A.A. et al., *Paediatric Stomatology*. Moscow, pp. 3-5, 1991.
8. Towner E. *The history of dental health education: a case study of Britain*. Oral Health Promotion, Oxford Medical Publications, 1993.
9. W.H. van Palenstein Helderma, L. Munck, S. Mushendwa, M.A. van't Hof and F.G. Mrema, *Effect evaluation of an oral health education programme in primary schools in Tanzania*. Community Dentistry and Oral Epidemiology 1997; 25: 296-300.
10. Michael V. Morgan, Adele C. Campaign, Geoff G. Adams, Steven J. Crowley, and F.A. Clive Wright, *The efficacy and effectiveness of a primary preventive dental programme in non-fluoridated areas of Victoria, Australia*. Community Dental Health (1998) 15, 263-271.
11. M. Laiho, E. Honkala, V. Nyyssonen and A. Milen, *Three methods of oral health education in secondary schools*. Dental Research 1993, 101: 422-7.
12. Marja Lahio, Eino Honkala and Lasse Kannas, *How is oral health education conducted in Finnish health centers?* Community Dentistry and Oral Epidemiology 1995; 23: 119-24.
13. Anders Thylstrup, Dorte Vinther and Jette Christiansen, *Promoting changes in clinical practice. Treatment time and outcome studies in a Danish public child dental health clinic*. Community Dentistry and Oral Epidemiology 1997; 25: 126-34.
14. Eva Borssen and Christina Stecksén-Blicks, *Risk factors for dental caries in 2-year-old children*. Swedish Dental Journal 1998; 22: 9-14.
15. L.A. Heløe and K.G. König, *Oral Hygiene and Educational Programs for Caries Prevention*. Caries Research 12 (Supplement 1): 1978; 83-93.
16. Schou L., *Active involvement principle in dental health education*. Community Dentistry and Oral Epidemiology 1985; 13: 128-32.
17. Schou L., *Use of mass-media and active involvement in a national dental health campaign in Scotland*. Community Dentistry and Oral Epidemiology 1987; 15: 14-8.
18. Kay E. J., Locker D. *Is dental health education effective? A systematic review of current evidence*. Community Dentistry and Oral Epidemiology 1996; 24: 231-5.
19. WHO, REGIONAL OFFICE FOR EUROPE. *Health promotion. A discussion document on the concept and principles*. Copenhagen, 9-13 July 1984.
20. Gerald Z. Wright, Paul E. Starkey, Donald E. Gardner. *Child Management In Dentistry*. A Dental Practitioner Handbook, pp. 1-4; 43-47; 1987.
21. Baric L., Binkhorn AS, Macarthur G. *A health education approach to nutrition and dental health education*. Health Education 1974; 33: 79-90.

22. King JM. *Patterns of sugar consumption in early infancy*. Community Dentistry and Oral Epidemiology 1984; 6: 47-52.
23. Anne Nordrehaug Astrom and Reidar Jakobsen. *The effect of parental dental health behavior on that of their adolescent offspring*. ACTA ODONTOL SCAND 1996; 54: 235-241.
24. Watson MR, Horowitz AM, Garcia I, Canto MT. *Caries conditions among 2-5-year-old immigrant Latino children related to parent's oral health knowledge, opinions and practices*. Community Dentistry and Oral Epidemiology 1999 Feb; 27(1): 8-15.
25. A. S. Blinkhorn. *Dental health education: what lessons have we ignored?* British Dental Journal Volume 184, No. 2, January 24 1998.
26. Ribakov A. I. et al., *Reference Book of Stomatology*. Moscow "Medicine" 1993, pp. 484-485.
27. Muradyan L. N. Deputy Minister of Health of Armenian Soviet Socialistic Republic, Topuzyan A. O. Deputy Minister of People's Education of Armenian Soviet Socialistic Republic(ASSR). *Complex Program for Prophylactic of Stomatological Diseases of Children In ASSR*. Order 639/271, Yerevan 1988.
28. Ministry of Health, *Department of Statistics and Sanitary Epidemiological Control*. Republic of Armenia. Yerevan 1995.
29. Ministry of Health, *Department of Maternal and Child Health*. Republic of Armenia. Yerevan 1999.
30. Garry Aslanyan, DMD, MPH, C. Robert Kurkjian, MS. *Fluoride Levels In The Drinking Water Of Yerevan, Armenia: An Assessment Of The Need For Artificial Water Fluoridation*. Canadian Journal of Community Dentistry. Volume 13, No.2 1998.
31. Government of Armenia, UNICEF, SCF. *Situation Analysis of Children and Women in Armenia*. 1999.
32. Ministry of Statistics. Republic of Armenia Yerevan 1999.
33. Allukian M. *Community Oral Health Programs, in: Clark JW, ed., Clinical Dentistry, II*. Philadelphia, 1987.
34. United Nations Development Program (UNDP), National Human Development Report (NHDR). *Armenia, Human Development Report*. Yerevan 1996.
35. <http://www.ada.org/newsrel/9802/nr-04.html>. American Dental Association. *The Developing Smile: Tooth Eruption Charts*. Copyright © February 2, 1998.
36. Personal Communication. Jinishian Memorial Program, Presbyterian Church, USA. Yerevan 1999.
37. Lu Ann Aday. *Designing and Conducting Health Surveys*. A Comprehensive Guide. Jossey-Bass Publishers, San Francisco, pp. 73-92, 1989.
38. "Davidashen Hamaikapetaran". Local brunch of Yerevan Municipality. Davidashen Hamaik (District), Yerevan, 1999.
39. WHO Noncommunicable Disease Division, WHO Collaborating Center, Lund University, Sweden, *Caries Prevalence: DMFT and DMFS*.
40. Levine R. *Scientific basis of dental health education, a policy document*. 4th edition, Health Education Authority London, 1995.
41. American University of Armenia. Department of Public Health, Center for Health Services Research. *Effectiveness Of A Health Education Program For The Pregnant Women In Yerevan. Final Report for Jinishian Memorial Program – Armenia*. Yerevan, Armenia, November 1997.
42. Personal communication John Joseph Murray, Dean of Dentistry, Professor of Child Dental Health. Clinical Director, Newcastle Dental School.

43. Cambell D.T., Stanley J.C. *Experimental and Quasi-Experimental Designs for Research*. Chicago: Rand McNally, 1963.

APPENDIX

Table 2: Prophylactic Child (0-14 years) Dental Care in Armenia - 1990-1997

Year	Indicator					
	# of Children Examined (as % of all children)		# Needing Treatment (as % of children examined)		# of Children Treated (as % of children examined)	
1990	432,532	56.5	420,541	97.2	153,531	36.5
1991	234,729	54.3	221,780	94.5	157,396	71.0
1992	347,001	54.0	129,340	37.3	129,340	100
1993	388,007	45.0	209,669	54.0	132,275	63.1
1994	259,640	39.2	138,391	53.3	72,272	52.2
1995	269,292	39.0	138,300	51.4	65,059	47.0
1996	294,913	28.1	156,678	53.1	56,547	36.1
1997	147,429	17.0	78,889	53.5	8,893	11.3
1998	84629	9.0	41330	48.8	10906	26.4

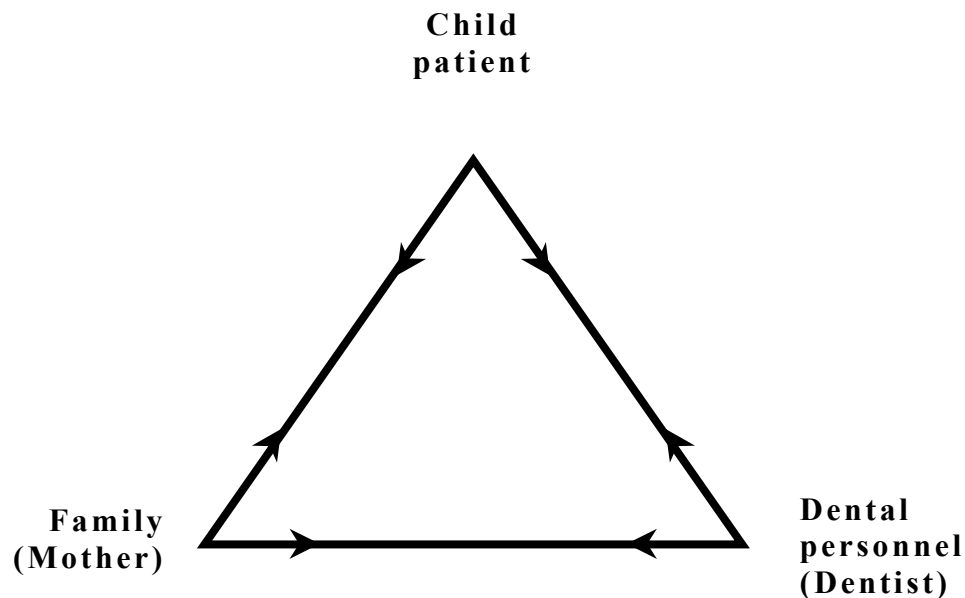
Data Source: Ministry of Health , RoA, 1998, 1999

Table 3: Prophylactic Child Dental Care carried out in Yerevan according to the Form number 1.

Year	Indicator					
	# of Children Examined (as % of all children)		# Needing Treatment (as % of children examined)		# of Children Treated (as % of children examined)	
1989	253683	78%	131154	51.7%	108906	83.0%
1994	148594	48%	77268	52%	39267	50.8%
1996	194805	59%	156678	80.4%	56347	36.0%
1997	122214	49%	58561	47.9%	8452	14.4%
1998	49508	22%	18829	38.0%	6190	32.9%

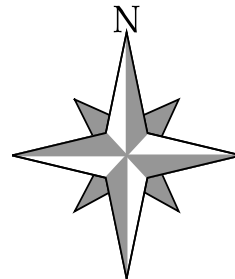
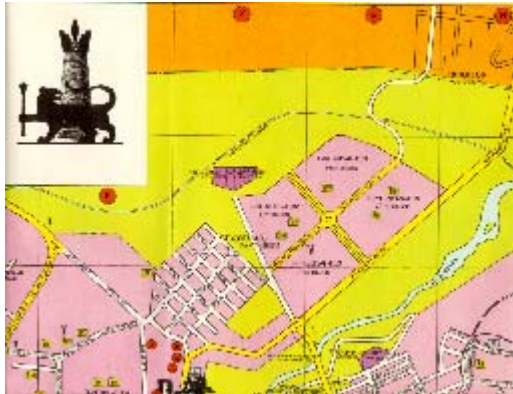
Data Source: Ministry of Health , RoA, 1999

Figure 1: FUDAMENTALS OF BEHAVIOR MANAGEMENT
Paedodontic (Pediatric) Treatment Triangle.

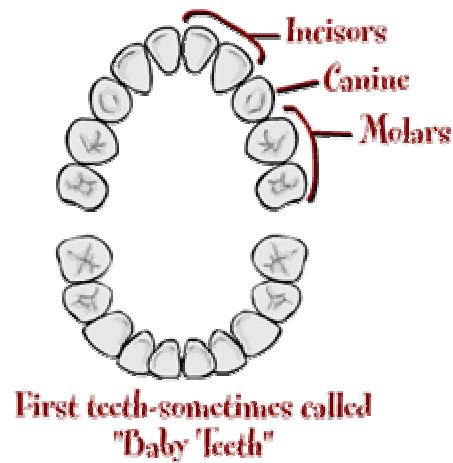


The Paedodontic Treatment Triangle emphasises:

- ❖ The lines that are drawn from the corner labelled as "Dental personnel" show that treating children is at least a one-to-two relationship, i.e. dental personnel to child and parent.
- ❖ Child is drawn at the apex of the triangle, i.e. at the focus of attention, whereas at the base of triangle are mainly adults.
- ❖ The mother frequently is the most influential member of family who can affect the child's behaviour.
- ❖ All parts of the Triangle are interrelated and they are dynamic and ever changing relationships.

Figure 2: DAVIDASHEN HAMAIAK OF YEREVAN

- ❖ The total population is 50,800 people and size is 671 ha..
- ❖ The Hamaik itself is subdivided on 4 geographic districts (blocks) and 16 paediatric sections.
- ❖ Total number of families is 6548.
- ❖ Total number of children aged 2-6 years old (that is the target population of the program) is 1790.
- ❖ There are 5 kindergartens, where total number of children attending these kindergartens is 935, out of which 95 are children under 3 years old; 403 are children aged 3 – 6 years old; 210 are children aged 6 years old and 227 are children aged 7 years old.
- ❖ There are one Children's Stomatology Policlinics # 5, and one Paediatric Polyclinic 20, which serve all Davidashen's Hamaik (District).

Figure 3:**DENTAL HEALTH EDUCATION COURSE CURRICULUM****OVERVIEW**

A total of 12 dental health education classes will be conducted (3 class per week) among the mothers of the children aged 2-6 years old in the Davidashen Hamaik (District) of Yerevan.

Rationale: to increase dental health related knowledge of the main caretakers of the children, i.e. mothers and through them improve dental health related behaviour of the children and finally address the problem of dental caries.

Time

Each class will last from 1 to 1 and 1/2 hours and total 12 classes will take place.

Class Structure

Each class will consist of introductory, main and conclusive parts. For tooth brushing and tooth flossing classes there will be organised practical sessions. The introductory part will consist of reinforcement of preceding class material and introduction into the new topic. The main part will emphasise on the topic of the day and will include demonstration of video educational film. Finally the conclusive part will imply questions and answers.

The possible time distribution of the class will be as follows:

1. Introduction – about 15 minutes.
2. Main part:
 - video-presentation – about 15 minutes
 - lecture about the same particular topic – 20 minutes
 - practical sessions (for tooth brushing and tooth flossing classes) – about 10 minutes
3. Conclusive part – about 20 minutes.

Class Instructors

Trained dentist and his assistant, student of the Public Health program preferably with dental background will carry out the education classes.

Class Materials/Resources

- VideoCassette Recorder (VCR).
- Educational video tapes.
- Lecture handouts.
- Markers/Pencils/Paper.
- Models for practical sessions.
- Projector/transparencies.

TITLE AND CONTENT OF CLASSES**CLASS 1: ORAL HEALTH**

The first class will make the mothers familiar with the schedule and goals of the future education classes. Additionally, there will be highlighted importance of the oral health as part of total body health.

CLASS 2: ANATOMY OF MOUTH CAVITY AND THE VALUE OF TEETH

The class will be focused on anatomy and main functions of mouth cavity. Additionally, information regarding structure of teeth will be provided and the value of teeth will be emphasised. Separate attention will be put on role primary (milk) teeth and dentition.

CLASS 3: GROWTH AND DEVELOPMENT OF TEETH

The class will imply information about primary and permanent teeth growth and development. The role of healthy pregnancy will be underlined in the development of teeth. Also eruption dates of the children's primary and permanent teeth will be emphasised. The mothers will be provided with charts with the dates of eruption and shedding of primary teeth and dates of permanent teeth eruption.

CLASS 4: DENTAL DISEASES

The class will introduce different dental diseases (classification) and the will focus on dental caries. Particularly, as an example of dental caries issues concerning Bottle Tooth Decay will be discussed.

CLASS 5: DENTAL CARIES

The aetiology and risk factors for developing dental caries will be highlighted. Among the questions that will be discussed are:

- What is plaque?
- Structure of the plaque
- Role of the plaque in the development of dental caries.

CLASS 6: ETIOLOGY AND DENTAL DISEASES

Once more class will discuss aetiology of dental caries and will focus on pathogenesis and mechanisms of dental caries development.

CLASS 7: COMPLICATIONS OF DENTAL CARIES

Possible complications of dental caries will be discussed. Thus, the importance of preventing dental caries as early as possible will be underlined.

CLASS 8: CARIOGENIC AND ANTICARIOGENIC DIET

The class will be devoted to diet issues. Questions concerning cariogenic and anticariogenic food items will be discussed, additionally ways of controlling sugar consumption will be emphasised.

CLASS 9: HOW TO PREVENT DENTAL CARIES AND ROLE OF FLUORIDES

The class will bring in different means and tools for dental caries prevention. The importance of fluorides for dental caries prevention will be underlined.

CLASS 10: OTHER TOOLS FOR DENTAL CARIES PREVENTION

The class will continue discussion of the means for dental caries prevention. Particularly, the role of dental sealant will be discussed. Also introduction into the dental hygiene will be carried out.

CLASS 11: TOOTH BRUSHING AND TOOTH FLOSSING

Correct technique and an appropriate frequency of tooth brushing and tooth flossing will be discussed. Practical sessions on models will be organised to reinforce theoretical skills.

CLASS 12: DENTAL VISITS

The importance of regular dental check-ups will be emphasised. Also the mothers will make aware that for good oral health their children should continue to visit dentist regularly. Closing part: the mothers will be thanked for participation in the classes. Finally, toothpaste, toothbrushes and dental flosses will be distributed among the mothers.



Table 4: EXPECTED BUDGET

EXPECTED PROJECT NEEDS	EXPLANATION/DESCRIPTION	EXPENDITURES inUS\$
Permanent Staff: Program co-ordinator (manager) and research assistant.	Total duration of the program is 3 years and 5 month (41 month): from January 1, 2000 till May 1, 2003. The program manager will be paid \$400 per month and research assistant \$250 per month.	\$400@41(month)=\$16400. \$250@41(month)=\$10250.
Subtotal:		\$26650
Phase 1: 5 interviewers and 3 dentists will be hired	The interviewers team will finish surveying of 100 mothers in 5 days and the oral examinations of 100 children will be completed in about 5 days as well. The interviewers and dentists will be paid \$20 per person per day, plus \$15 for the training sessions.	\$20@5(interviewers)@5days=\$500 \$20@3(dentists)@5days=\$300 \$15@5(training)@2days=\$150 \$15@3(training)@2days=\$90
Xeroxing of questionnaires, and forms for oral examinations	Assumptions: length of the questionnaires equal to 8 pages and examination forms equal to 2 pages.	\$0.04@8(pages)@100(copies)=\$32 \$0.04@2(pages)@100(copies)=\$8
Subtotal:		\$1080
Phase 2: Class Instructors: A dentist and an assistant will be hired.	The dentist will be paid \$20 per day and the assistant will be paid \$15 per day, plus \$15 for the training sessions.	\$20@1(dentist)@12(days)=\$240 \$15@1(assistant)@12(days)=\$180 \$20@(training)@2(days)=\$40 \$15@(training)@2(days)=\$30
<i>Education Materials:</i> Handouts	Assumption: 15 pages of educational materials (handouts) per week will be distributed among mothers. Since duration of the classes is 4 weeks total 60 pages for each mother will be distributed.	\$0.04@50(copies)@60(pages)=\$120

Education films(video cassettes)	4 education films for each week of classes will be purchased. The approximate price of the films is estimated from personal communication with dental hygienist and maximal possible price is taken to avoid underestimation of the budget.	\$125@4(items)=\$600
Rent of VCR and Projector	VideoCassette Recorder with TV will be rented. The rent will be \$20 per day	\$20@1(VCR)@12(days)=\$240 \$20@1(Projector)@12(days)=\$240
Notebooks and pens	The mothers will be supplied with notebook and pen for note taking. The notebook costs \$1.25 per item, and pen \$0.30 per item (Stationary store "Noyan Tapan").	\$1.25@1(item)@50(mothers)=\$62.5 \$0.30@1(item)@50(mothers)=\$15
Toothpaste, Toothbrush, Dental floss	12 tubes of fluoridated ToothPaste "Colgate", 1 Tooth Brush, 1 Dental Floss Johnson&Johnson. The prices for these items are based on preliminary analysis of Armenian Market: ToothPaste "Colgate" 50ml \$0.75 per item; ToothBrush Johnson&Johnson \$1.18 per item; Dental Floss Johnson&Johnson \$1.55 per item.	\$0.75@12(items)@50mothers=\$450 \$1.18@1(item)@50(mothers)=\$59 \$1.55@1(item)@50(mothers)=\$77.5
Subtotal:		\$2354
Phase 3: 5 interviewers will be hired	The interviewer team will finish surveying of 100 mothers in 5 days and will be paid \$20 per person per day, plus \$15 for the training sessions.	\$20@5(interviewers)@5days=\$500 \$15@5(training)@2days=\$150
Xeroxing of questionnaires.	Assumptions: length of the questionnaires equal to 8 pages.	\$0.04@8(pages)@100(copies)=\$32
Subtotal:		\$682
Phase 4: Class Instructors: A dentist and an assistant will be hired.	The dentist will be paid \$20 per day and the assistant will be paid \$15 per day, plus \$15 for the training sessions.	\$20@1(dentist)@5(days)=\$100 \$15@1(assistant)@5(days)=\$75 \$20@(training)@2(days)=\$40 \$15@(training)@2(days)=\$30

Rent of VCR and Projector	VideoCassette Recorder with TV will be rented. The rent will be \$20 per day	$\$20@1(\text{VCR})@5(\text{days})=\100 $\$20@1(\text{Projector})@5(\text{days})=\100
Toothpaste	20 tubes of fluoridated Tooth Paste "Colgate" 50ml - \$0.75 per item;	$\$0.75@20(\text{items})@50\text{mothers}=\750
Subtotal:		\$1195
Phase 5:		
3 dentists will be hired	The oral examinations of 100 children will be completed in about 5 days, the dentists will be paid \$20 per person per day, plus \$15 for the training sessions.	$\$20@3(\text{dentists})@5\text{days}=\300 $\$15@3(\text{training})@2\text{days}=\90
Xeroxing of forms for oral examinations.	Assumptions: length of the examination forms equal to 2 pages.	$\$0.04@2(\text{pages})@100(\text{copies})=\8
Toothpaste, Toothbrush, Dental floss	2 tubes of fluoridated Tooth Paste "Colgate", 1 Tooth Brush, 1 Dental Floss Johnson & Johnson. will be distributed among mothers, this time not only in the intervention group, but in the non-intervention group as well. The prices for these items are based on preliminary analysis of Armenian Market: Tooth Paste "Colgate" 50ml \$0.75 per item; Tooth Brush Johnson & Johnson \$1.18 per item; Dental Floss Johnson & Johnson \$1.55 per item.	$\$0.75@2(\text{items})@100\text{mothers}=\150 $\$1.18@1(\text{item})@100(\text{mothers})=\118 $\$1.55@1(\text{item})@100(\text{mothers})=\155
Subtotal:		\$821
MISCELLANEOUS		\$2000
GRAND TOTAL		\$34782