Impact of dental insurance on adults’ oral health care in Tehran, Iran.

Fariborz Bayat

Academic dissertation

To be presented with the permission of the Faculty of Medicine of the University of Helsinki, for public discussion in the main auditorium of the Institute of Dentistry, Mannerheimintie 172, Helsinki, on 28 May, 2010, at 12 noon.

Helsinki 2010
To Miira for her sincere help and efforts all over my thesis project

To Farnaz, Dorna, and Ehsan, for their patience, understanding and affection.
ABSTRACT


The aim of the present study was to determine relationships between insurance status and utilization of oral health care and its characteristics and to identify factors related to insured patients’ selection of dental clinic or dentist.

The study was based on cross-sectional data obtained through phone interviews. The target population included adults in the city of Tehran. Using a two-stage stratified random technique, 3,200 seven-digit numbers resembling real phone numbers were drawn; when calling, 1,669 numbers were unavailable (busy, no answer, fax, line blocked). Of the 1,531 subjects who answered the phone call, 224 were outside the target age (under 18), and 221 refused to respond, leaving 1,086 subjects in the final sample. The interviews were carried out using a structured questionnaire and covered characteristics of dental visits, the respondent’s reason for selecting a particular dentist or clinic and demographic and socio-economic background (gender, age, level of education, income, and insurance status). Data analysis included the Chi-square test, ANOVA, and logistic regression and the corresponding odds ratios (OR).

Of all the 1,086 respondents, 57% were women, 62% were under age 35, 46% had a medium and 34% a high level of education, 13% were under the poverty line, and 70% had insurance coverage; 64% with the public, and 6% with a commercial insurance. Having insurance coverage was more likely for women (OR=1.5), for those in the oldest age group (OR=2.0), and for those with a high level of education (OR=2.5). Of those with dental insurance, 54% reported having had a dental visit within the past 12 months; more often by those with commercial insurance in comparison with public (65% vs. 53% p<0.001). Check-up as the reason for the most recent visit occurred most frequently among those with commercial insurance (28%) compared with those having public insurance (16%) or being non-insured (13%) (p<0.001). Having had two or more dental visits within the past 12 months was most common among insured respondents, when compared with the non-insured (31% vs. 22% p=0.01). The non-insured respondents reported tooth extractions almost twice as frequently as did the insured ones (p<0.001). Of the 726 insured subjects, 60% selected fully out-of-pocket-paid services (FOP), and 53% were unaware of their insurance benefits. Of those who selected FOP, good interpersonal aspects (OR=4.6), being unaware of dental insurance benefits (OR=4.6), and good technical aspects (OR=2.3) as a reason had greater odds of selecting FOP.

The present study revealed that dental insurance was positively related to demand for oral health care as well as to utilization of services, but to the latter with a minor extent. Among insured respondents, despite their opportunity to use fully or highly subsidized oral health care services, good interpersonal relationship and high quality of services were the most important factors when an insured patient selected a dentist or a clinic. The present findings indicate a clear need to modify dental insurance systems in Iran to facilitate optimal use of oral health care services to maximize the oral health of the population. A special emphasis in the insurance schemes should be focused on preventive care.
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LIST OF ORIGINAL PUBLICATIONS

This present dissertation is based on the following publications, referred to the text by their Roman numerals.


IV. Bayat F, Murto MAA H, Vehkalahti MM, Tala H. Does dental insurance make a difference in type of service received by Iranian dentate adults? Eur J Dent (Accepted, October 2009)
**ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ADA</td>
<td>Australian Dental Association</td>
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<tr>
<td>ANOVA</td>
<td>Analysis of variance</td>
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<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
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<td>CPI</td>
<td>Community Periodontal Index</td>
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<tr>
<td>DT</td>
<td>Decayed teeth</td>
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<td>DMFT</td>
<td>Decayed Missing Filled Teeth</td>
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<tr>
<td>EMRO</td>
<td>Eastern Mediterranean Regional Office</td>
</tr>
<tr>
<td>FCC</td>
<td>Full Coverage of Cost</td>
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<td>FHS</td>
<td>Free or highly subsidized services</td>
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<td>FOP</td>
<td>Fully out-of-pocket</td>
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<td>FT</td>
<td>Filled teeth</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>HBS</td>
<td>Household Budget Survey</td>
</tr>
<tr>
<td>MHME</td>
<td>The Ministry of Health and Medical Education (in Iran)</td>
</tr>
<tr>
<td>MT</td>
<td>Missing teeth</td>
</tr>
<tr>
<td>NHI</td>
<td>National Health Insurance</td>
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<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<tr>
<td>NHS</td>
<td>National Health System</td>
</tr>
<tr>
<td>NIDCR</td>
<td>National Institute of Dental and Craniofacial Research</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OHS</td>
<td>Oral Health Survey</td>
</tr>
<tr>
<td>OHSIC</td>
<td>Oral Health Situation of Iranian Children</td>
</tr>
<tr>
<td>OR</td>
<td>Odds ratio</td>
</tr>
<tr>
<td>PDCs</td>
<td>Public Dental Clinics</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>SCI</td>
<td>Statistical Centre of Iran</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>TTC</td>
<td>Tehran Telecommunication Company</td>
</tr>
<tr>
<td>USD</td>
<td>United State Dollar</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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1. INTRODUCTION

Oral health is an integral and critical component of general health and well-being and must be included in the provision of health care (American Dental Association, 2006). Achieving and maintaining oral health requires individual action, complemented by community-based activities and professional care (Bendall and Asubonteng, 1995).

Receiving oral health care services as a professional care is mediated by a myriad of personal, cultural, and institutional factors, being dependent on individual characteristics and on the characteristics of the oral health care system, such as availability of third-party payment options (Kiyak, 1993; Manski and Goldfarb, 1996; Österberg et al., 1998).

To seek care, an individual must believe that he or she needs it. This requires individuals to have a concept of expectations of good health, to believe that health care personnel can help them to achieve their care goals (Kegeles, 1961), and to place a value on oral health care (Petersen and Pedersen, 1984). With the assumption that the patient can overcome cultural and psychological issues and decide to use oral health care services, then the health care system should have the appropriate characteristics to encourage the individual to use health care services (Daly et al., 2002a).

Among the barriers to oral health care utilization such as poverty, ignorance, and lack of financial resources, the latter is the major barrier (NIDCR, 2008). Even in developed economies, financial resources are not always available or allocated appropriately to ensure that all humans have access to oral health care (Nash et al., 2008). Characteristics of oral health care delivery systems, particularly the financial component, and insurance play an important role in easing access to oral health services by reducing costs.

Insurance is a type of third party system whereby the premiums of many people are collected and pooled by an underwriting company, which in turn agrees to pay the insured a certain amount of money in case of an unpredictable loss to the individual. Essentially, then, the premiums of many people are collected to protect against individual loss (Praiss et al., 1978). Dental insurance differs from the classic insurance model, since the concept of risk and unpredictability are far less relevant for oral diseases (Evans and Williamson, 1978). With exception of accidents and some dental infections, needs for oral health care are widespread and more or less predictable (Feldstein, 1973; 2004). Because of these factors, dental insurance can be viewed more as a budgeting system for the consumer, rather than as protection against unpredictable, catastrophic loss (Zatz et al., 1987; Feldstein, 1973; 2004). It is, then, best to consider dental insurance as a benefit plan that is partly insurance, partly pre-payment, and by its large volume discounted (Manski, 2001).

Iran is a lower-middle-income oil-exporting country with an estimated population of 68 million and the sixth largest country in Asia, in terms of area (WHO, 2002). Of the Iranian population, 12% reside in Tehran (around 8 million in 2003); the largest city in the country with the highest employment rate and with around 28% of the adult population’s holding an academic degree or studying in university/college (SCI, 2004).

In Iran, with its developing oral health care system, basic oral health care is available in public dental clinics financed by the government for all inhabitants of the country. Two dental insurance
schemes are available for the employed and their family members: public and commercial. Approximately 60% of the Iranian population is covered for oral health care services; of these, 83% have public and 17% have commercial health insurance (SCI, 2004). Although all employees are able to purchase health insurance either via their employer or the state, 40% of the Iranian population has no health insurance. The vast majority of dental practitioners (80%) work in the private sector (Pakshir, 2004). Subjects with no insurance can use either private or public dental clinics, the latter with fees about half those for private care. The majority of Iranian adults (18- to 45-year-olds) have decayed teeth, dental plaque, calculus, and deepened periodontal pockets indicating vast unmet treatment needs in Iran (Hessari, 2009).

The present study assessed the impact of dental insurance, as an important part of the financial component of the health care delivery system, on individuals’ demand for and utilization of oral health care and also assessed factors related to selecting a clinic/dentist among insured patients.
2. LITERATURE REVIEW

2.1. Individual factors related to use of oral health care services

Understanding the behaviour of both individuals and providers is essential to determine relevant factors which influence decision-making and utilization of oral health care. The overall decision-making process of patients’ oral health care service utilization can be divided into three stages: a) contact; individuals must decide whether to go to a dentist, b) the choice of service sector, and c) frequency: the number of visits to the chosen dentist (Sintonen and Maljanen, 1995).

Contact refers to demand; it is a patient-initiated process where the patient makes a request for care (Dworkin et al., 1978). Factors influencing whether a person will make contact with health services includes sociological and psychological factors i.e. culture, people’s belief, attitudes, expectations, and definitions of health and sickness (Daly, 2002a). These factors are related to perceived need, and affect the demand for dental service (Feldstein, 1973; Spencer, 1980; Davis, 1982). Almost everyone needs oral health care as determined by clinical examination (normative need). However, not all individuals who are in need of care seek it (Dworkin et al., 1978).

Choice of service sector: dental service is a dynamic process between the provider and the recipient (Freeman, 1999a). While making the choice of service sector, patients assess a number of various elements related to a particular dentist. The most important elements include dentist-patient relationship and technical aspects (Newsome and Wright, 1999a). In addition, availability, accessibility, affordability, and acceptability of the care delivery system affect patients’ assessments (Newsome and Wright, 1999b; Daly, 2002a; Skaret et al., 2005).

Frequency refers to utilization of services which are defined as amount and type of oral health care services received as a result of decisions arrived at jointly by the patient and the dentist (Feldstein, 1973). Utilization of professional care should be considered as achieving and maintaining good oral health (Bendall and Asubonteng, 1995). Oral health care utilization is a multifactorial phenomenon that depends on socio-demographic characteristics of the individuals, perceived dental health, people’s health beliefs and attitudes, financial problems, and organization of oral health care services (Manski and Goldfarb, 1996; Steele et al., 1996; Österberg et al., 1998; Lo et al., 2001; Kronström et al., 2002; Ekanayake and Mendis, 2002; Ugur and Gaengler, 2002; Stewart et al., 2002).

Supplier inducement could also play an increasing role in demand for oral health care services and their utilization, as a result of a marginal increase in the number of dentists, all else being equal (Sintonen and Maljanen, 1995; Sintonen and Linnosmaa, 2000; Grytten, 2001b). Supplier inducement operate in two ways: by increasing the number of patients requesting care, and by increasing the amount of care provided per patient (Grytten, 2001a).

Accordingly, the patient’s perception of subjective need, demand, supplier inducement, and the characteristics of the care-delivery system determine the utilization of oral health care services (Penchansky and Thomas, 1981; Daly, 2002a).

2.2. Oral health care system

Oral health care systems have a goal to attain freedom from diseases and impairments, and seek to improve the quality of life for the population served (Baker, 1970; Scott, 1987). Consequently,
increasing the proportion of the population with access to adequate oral health is among the targets of health care services (Hobdell et al., 2003).

Oral health care systems can be described by policy, organization, payment mechanisms, and outcomes (Gift and Andersen, 2007). Worldwide, systems differ in the focus placed on the range of functions. Often oral health care systems have been described on the basis of only one or two characteristics, perhaps reflecting what is most unique to the country. For example, the Nordic system has been characterized as a significant government involvement in both financing and delivery of services (Holst, 2007a); the British system as a national health service (Daly et al., 2002b); and the US often as a fee-for-service private practice system (Manski, 2009). Many developing countries emphasize relief of pain and emergencies, leaving their populations suffering years of neglect (Pack, 1998), and have been described as treatment-oriented systems.

The oral health care delivery system includes two dimensions: financing and provision of services (Holst, 2007a). The financing of oral health care is concerned with the amount and sources of funds that pay for such services (Bailit and Beazoglou, 2008). Two main issues are related to financing the oral health care system: 1) how the money gets into the system, 2) the mechanism for payment for services (i.e. reimbursement). The choice of a financing system is largely determined by the institutional, historical, and political context in which the countries’ oral health care services have evolved (Chen et al., 1997; Gift et al., 1997; Holst, 1997).

The source of reimbursement can be described through the mechanism of payment. The basic source of financing for health services includes directly out-of-pocket payment as in Iran (Pakshir, 2004), general government revenues or specific taxation as in the Nordic countries (Holst, 2007a), and insurance or prepayment premiums as in Germany (Nomura, 2008).

### 2.3. Payment mechanisms for oral health care

A typology of combinations of financing and provision of care as described by Holst (2007b) implemented a framework for discussion on different payment mechanisms according to location of care provision: public vs. private, and the amount of money that the patient pays out-of-pocket (Figure 1).

At one end of the financing dimension (horizontal arrow) there is Full Coverage of Cost (FCC) by the public or a third party and no direct payment by the patient. At the other end of the scale, the patient pays fully out-of-pocket (FOP) all costs with no third-party intervention. Between these two extremes are number of co-payment or co-insurance, deductible and maximum coverage limits.

Along the provision dimension (vertical arrow) there is public service with a salaried dentist at one end, and private with an independent dentist at the other. Between these two extremes, there are a variety of contracting arrangements between public institutions and private entrepreneurs. Combining these two dimensions produces a typology with four ultimate types (A, C, D, F) and extremes spectrum of arrangements (B, E).

Receiving oral health care services in the public sector with
A) Full coverage of cost (FCC) by the public, no cost for the patient
B) Co-payment
C) Fully out-of-pocket (FOP)

Receiving oral health care services in the private sector with
D) Full coverage of cost (FCC) by a third party, no cost for the patient
E) Co-insurance
F) Fully out-of-pocket (FOP)


2.3.1. Public sector

Regarding patient payment, three possibilities exist: no cost, co-payment, and fully patient-paid.
A) Oral health care services with no cost for the patient: The state raises funds directly through general taxation (Daly et al., 2002b). Basic oral health care services are provided by a salaried dentist in Public Dental Clinics (PDCs) that usually are available all over the given countries (part A, Figure 1).
B) Oral health care services with co-payment (an amount based on a percentage of costs): The state pays part of dental service expenditures, which is funded by means of general taxation. Adults who attend PDCs comprise this part of the model. In this arrangement the fee schedule is fixed by the state, and the patient must contribute to a part of the cost of services as co-payment (part B, Figure 1).
Publicly financed oral health care services, as shown in these two arrangements, are more common in countries that have strong public control and management of their welfare services, for example the Nordic countries (Grytten, 2005).
C) Oral health care services with full patient payment: the patient pays all costs of oral health care services directly out-of-pocket. Salaried dentists provide oral health care services in the public sector according to a fee schedule which is fixed by the state annually (Part C, Figure 1). Providing services for adults in developing countries like Iran could be considered under this heading.

2.3.2. Private sector

Regarding patient payment, three possibilities exist: no cost, co-insurance, and full patient payment.
A) Oral health care services at no cost to the patient: In this arrangement, employers offer services to employees as fringe benefits, and pay the whole cost of services either directly to the patient/private dentist or to private insurance companies (premium). Services are provided by a contract between private insurance companies and dentists practicing in private dental clinics. Payment of the full cost of oral health care services by employers in Iranian commercial insurance (Bayat et al., 2006), and some private insurance schemes in the USA (Chapin, 2009) could be considered as members of this part (part D, Figure 1).

B) Oral health care services according to co-insurance include public health insurance and private health insurance (Part E, Figure 1).

In a public insurance scheme, the insurance company is publicly owned. There is usually only one insurance company, the state. Membership in the insurance scheme is compulsory for everyone. Adults in work, both salaried and self-employed, make compulsory payments through deductions from their wages or income. Employers also contribute additional sums for their employees (Daly et al., 2002b; Widström and Eaton, 2004; Grytten, 2005). The insurance reimburses some of the costs of oral health care, the refund rate may range from 30 to 65% (70–35% co-insurance) depending on the patient’s age and category of treatment. Most health services for adults in North European countries are financed in this way (Holst, 1997; Grytten, 2005). In Finland and Sweden this scheme acts as a complementary plan to refund a proportion of the cost of health services for those who receive their oral health care via the private sector (Widström and Eaton, 2004).
A private dentist provides oral health care services through making a contract with the insurance company. Patients, in some cases, pay full fees to the dentist, and then the public insurance reimburses some or all of the costs of care. Patients can visit any dentist they like. However, if the dentist has no contract with their sickness insurance, then the patient is expected to pay the dentist’s bill and obtain a reimbursement from the sickness insurance of up to 60 to 80% (Buss and Riesberg, 2004; Vuorenkoski et al., 2008) of the amount specified in the sickness fund tariffs. In Germany, however, all employers and employees must pay the premium, but this scheme provides oral health care for employees and their families who earn less than a certain amount of money per month/year (Nomura, 2008). The rest of the population is encouraged to take out private health care insurance to cover their oral health needs.

Private dental insurance is an alternative to public insurance (Feldstein, 1973; Bailit, 1999). These types of insurances are available, partly to complement treatment costs covered by the public health insurance scheme and partly to cover costs not subsidized by the public (Widström and Eaton, 2004). These schemes are financed through individuals or are based on an employer-employee premium. Private health insurance schemes are most frequent in the USA (Manski and Cooper, 2007), and relatively frequent in Western European countries (Widström and Eaton, 1999). In the Netherlands under the Health Insurance Act (Zorgverzekeringswet, 2007), all residents are obliged to take out health insurance which is offered by private health insurance companies. The insured person pays a nominal premium to the health insurer. People in the same position will pay the same insurance premium. Employers contribute to the scheme through making a compulsory payment towards the income (The Netherlands’ Ministry of Health, 2010). In the USA, employers as the main payers for care usually contract with insurers to administer these funds. Payers decide what services are covered by benefits, the amount and types of patient cost-sharing for the covered services, and how dentists are paid for their services (Bailit and Beazoglou, 2008).

C) Oral health care services with full patient payment: Traditionally, payment for oral health care comes from out-of-pocket expenditures by the consumer, who reimburses the private practitioner directly on a fee-for-services basis. A patient without any third party coverage has to pay the treatment cost directly to the dentists, as mostly in developing countries like Iran (part F, Figure 1).

Several ways have been used to describe and categorize the insurance programs. In developed countries, especially those which are members of the OECD (Organization for Economic Co-operation and Development), typical models of social insurance institutions exist according to similar historical, cultural, economic, ideological and political circumstances which they hold in common, (Korpi and Palme, 1998; Widström and Eaton, 2004; Sander et al., 2009). In developing countries the conditions are so different that these systems cannot easily be used as a model. To better understand the health insurance scheme in Iran, Table 1 shows some characteristics of the health insurance system in Finland, Germany, and the USA, representing the encompassing (Nordic), corporatist (Bismarckian), and basic security (Beveridgian) models respectively, since it seems that some characteristics of health insurance in these countries are relatively close to the health insurance system in Iran.
<table>
<thead>
<tr>
<th>Institutional structure (Model)</th>
<th>Insurance type</th>
<th>Financing</th>
<th>Target population</th>
<th>Provider</th>
<th>Type of services</th>
<th>Reimbursement</th>
<th>Dentists density per 1000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Encompassing model (Finland)</strong></td>
<td>Sickness insurance</td>
<td>Taxation</td>
<td>All permanent residents</td>
<td>Private dentists</td>
<td>Dental examination, preventive care, fillings, oral surgery, periodontal care, endodontics¹</td>
<td>Up to 60% of the established basic tariff defined by the Government¹</td>
<td>1.28 (2002)²</td>
</tr>
<tr>
<td><strong>Universal sickness insurance</strong></td>
<td>Sickness funds through Krankenkassen (Employee, employer)</td>
<td>All insured along with their families (90% of population)³</td>
<td>Private contracted dentist</td>
<td>Examination, radiography, fillings, oral surgery, preventive, periodontal care, endodontics</td>
<td>100%</td>
<td>0.8 (2005)²</td>
<td></td>
</tr>
<tr>
<td><strong>Corporatist model (Germany)</strong></td>
<td>Individual insurance premiums</td>
<td>Civil servants, the self-employed, higher income earners, divorced spouses, severely disabled persons (9% of population)</td>
<td>Private dentists</td>
<td>All dental services</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Basic security model (USA)</strong></td>
<td>Federal centers for Medicaid and Medicare services</td>
<td>Certain low-income groups and the disabled according to state decision ⁵</td>
<td>Private contracted dentist</td>
<td>Preventive, basic restorative services, endodontic, oral surgery and limited prosthodontics</td>
<td>Approximately 50% of usual, customary and reasonable fees in each state (2002)</td>
<td>1.63 (2000)²</td>
<td></td>
</tr>
<tr>
<td><strong>Private insurance</strong></td>
<td>Employer-employee</td>
<td>Employee</td>
<td>Private dentist</td>
<td>Diagnostic and preventive services, endodontic, oral surgery and limited prosthodontics</td>
<td>100% ⁶</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Public insurance</strong></td>
<td>Employer, employee, state</td>
<td>Employed insured people and their families (50% of population)</td>
<td>Dentists hired by or contracted with insurance</td>
<td>Examination, x-rays, extraction, scaling, simple filling, periodontal procedures, full denture</td>
<td>80-90%</td>
<td>0.2 (2004)⁶</td>
<td></td>
</tr>
<tr>
<td><strong>Iran</strong></td>
<td>Commercial insurance</td>
<td>Employer</td>
<td>Employees and their families</td>
<td>Contracted dentist</td>
<td>All dental services ¹</td>
<td>80-90%</td>
<td></td>
</tr>
</tbody>
</table>

⁴This co-payment rate is reduced to 40% for recipients who undergo regular preventive examinations over a 5-year period (Federal Ministry of Health, 2007b).
⁵Adults had to be in households with incomes at or below 37% of Federal poverty level (Sweet et al., 2005).
⁶Co-payment differs according to dental plan which is purchased by employee or individuals.
⁷The provider is required to submit treatment plans before performing fixed prosthodontics, orthodontics and implants (preauthorization of costs)
⁸Dentist/population ratio for publicly insured is 1:3000, for commercial insured 1:1100 (Bayat et al., 2008)
2.4. Oral health care delivery system and health insurance schemes in Iran

The constitution of Iran (Article 29) obliges the government to provide the conditions of utilizing the social security services for all the population in the form of insurance or a non-insurance system. According to the law, the government is committed to finance these services and protections by using the general revenues and the income of public collaborations. The three different health care delivery sectors are government, the insurance system, and the private sector.

2.4.1. Oral health care services in the government sector

The Ministry of Health and Medical Education (MHME) has been financing and delivering primary health care (PHC) since 1983 (Nasseri et al., 1991). In 1997, oral health care was integrated into PHC, and the local health service was reorganised as a network of health centres covering the whole country, also the sparsely populated areas. In 2004, the number of Public Dental Clinics (PDCs) was 1548 in rural areas, 1362 in urban areas and 98 in Tehran (MHMEA). Children under the age of 12 years and pregnant or lactating mothers make up the target groups and are entitled to receive subsidised basic oral health care in the PDCs. Those aged 12 years and over meet all costs for oral health care out-of-pocket according to a fixed fee schedule which is determined by the MHME. The cost of services in PDCs for the target population is about 80 to 90% and for other people 50% less than the cost of the same service in private clinics without insurance.

Two types of practitioners exist in the public sector; 1) Dental therapists (n=700): these practitioners are obligated to work only in rural PDCs (Act of dental therapist training 1982), to provide simple care services with a monthly salary, which is usually half of that for dentists in same area 2) Dentists: Most Iranian dentists, after graduation, are obligated to work in PDCs in either rural (n=76) or urban (n=688) areas for two years (Act of health professional distribution 1979). The MHME is responsible for distributing these young dentists according to its priorities. Regarding the geographic situation of each PDC, the period of mandatory practice would be reduced by up to one year. In 2004, 37% of these dentists worked in Tehran’s PDCs. Along with dentists completing the mandatory practice stage, there exist dentists who are employed by the government, permanently, and work in urban public dental clinics (1147 in the whole country and 55 in Tehran). Both of these groups earn a monthly salary which is less than the amount earned by the dentists in private sector, and they provide simple care services. No differences exist in costs for performing care between a dentist and a therapist in rural areas (Pakshir, 2004). There is no waiting list in most PDCs; only in large cities does a patient have to make an appointment.

Dental hygienists (n=2300) play no role in the public system. Most of them work in Tehran’s private clinics (n=1120), under supervision of a dentist, and provide radiography and scaling.

The only oral health care service which is provided in primary school is weekly use of 0.2% sodium fluoride. This facility is according to a national oral health promotion program initiated in 2000, and involved school health technicians and volunteer teachers (Samadzadeh et al., 2001).

The main provider of oral health care services is the private sector, where more than 80% of the dentists are working. The dentist-population ratio in Iran is 1:5500 and in Tehran, 1:1800; 86% of private dentists work solo in a dental office (Medical Council of Iran, 2007).
2.4.2. Dental insurance schemes in Iran

Two dental insurance systems are available: public and commercial. The public insurance system (initiated in 1931) is overseen by the Ministry of Welfare and Social Security, since all companies under the Labour Law must insure their employees. About 83% of the insured people in Iran have this kind of insurance, but it covers only basic oral health care services. The employees’ compulsory premium is deducted from their wages or incomes, to contribute to health and social services. Oral health care benefits under the public insurance are free of charge at a clinic owned by the public (19 dental clinics in Tehran) and receive an 80 to 90% subsidy at a clinic contracting with the public insurance system (160 private dentists, and 98 public dental clinics in Tehran) (Social Security Organization, 2004; Medical Service Insurance Organization, 2004). To get benefits from their public insurance, patients can go to any public clinic or any private clinic contracting with public insurance. Almost all PDCs are contracted with the public health insurance.

There is no private dental insurance in Iran. Instead, since the 1990s firms and factories can buy health insurance for their staff from the same commercial insurance companies which insure their goods and services. For health insurance, the employers pay the total premiums for the employees and their families (employer-sponsored), as a fringe benefit. This amount of money which is paid by employers as the premium will be subtracted from the taxes that the company has to pay. Oral health care services are provided by a contract between commercial insurance companies and dentists practicing in private dental clinics (n=300 in Tehran). In most industrialized cities employers offer this fringe benefit to their employees. About 17% of insured Iranians are covered by commercial health insurance. These benefits are supposed to be used annually (Central Insurance of Iran, 2004). Recently, following the privatization policy, several commercial insurance companies have been established with a variety of oral health care benefits.

Remuneration to the dentists employed by public insurance is via a monthly salary, and for the contracted dentist is via fee-for-service payment. Insured subjects can use the benefits from one insurance scheme only. The High Council for Health Insurance is responsible for making changes to the social insurance provisions of each scheme, and sets the fee according to its own fixed tariff schedule. The fee for oral health care services in insurance schemes is obviously lower than that in the private sector (approximately 50% lesser). All health insurance schemes use the same fee schedule.

Public health insurance benefits continue after retirement. For commercially insured people this benefit will be stopped at their retirement. Some characteristics of Iran’s oral health care delivery system are shown in Table 2.

2.4.3. Oral health status and treatment needs among the Iranian population

Dental status is a trustworthy measure of oral health status among adult populations (Bagewitz et al., 2007). A view of the components of a population’s oral health is necessary to achieve comprehensive understanding of oral health needs. Apart from indirect and direct factors such as orientation of the oral health system, socio-economic and demographic background, and behavioral factors, dental caries and periodontal disease, have been the most common oral health disease. These have burdened the majority of the population with heavy treatment needs (Petersen et al., 2005) and are the major reasons for tooth extraction or tooth loss (Nuttall and Nugent, 1997).
The first nationwide survey concerning Iranian oral health status and treatment need (Jaber Ansari, 1998, MHME, 1993) was conducted in 1990-1992 on children and adults aged 6 to 69 years. This study revealed that the prevalence of dental caries among 15- to 19- and 35- to 44-year-olds was 87.3% and 98.8%, with their mean DMFT being 5 and 11.3, respectively. The second survey in 1997 (Samadzadeh et al., 1999) and the third survey in 1998-1999 (OHSIC, 2000) report the mean DMFT in 12-year-olds as being 2.0, and 1.5, respectively. The number of decayed teeth (DT) was a major contributor to the total caries experience. The most recent survey in Iran (OHS, 2004) was carried out in 2001-2002 to determine the caries experiences and periodontal status of two selected age groups, 15- to 19- and 35- to 44-year-olds. Their DMFT scores were 4.1 and 14.8, with DT and missing teeth (MT) as the major contributors to the total caries experience for these two groups.

Comparison of the two latest national surveys reveals a doubling of the mean DMFT for young adults: from 2 in 1997 to 4.3 in 2002 (Hessari, 2009). Whereas in developed countries, filled teeth (FT) is the main component of DMFT, in Iran, three-fourths of young adults were in need of restorative treatments. Similar to many industrialized countries, middle-aged Iranians have a moderate level of DMFT, which comprises values between 9.0 and 13.9. The notable difference is the dominance of MT (60%) for Iranian adults compared to the high proportion of FT among adults in industrialized countries such as Finland (70%) (Suominen-Taipale et al., 2008).

The only national data regarding periodontal status is from an investigation conducted in 2001-2002, which used the Community Periodontal Index (CPI) for this propose. According to this survey, periodontal status among Iranian young adults demonstrated a high frequency of dental plaque; among middle-aged adults, a high frequency of calculus and deepened pockets characterized periodontal treatment needs (OHS, 2004).

Comparison of studies done on the adults at the age of 35 to 44 years in Iran from 1988 to 1990 (MHME, 1993) with that reported in 2009 (Hessari, 2009) shows that the level of edentulousness has tripled (from 1% to 3%) with the mean number of teeth being about three teeth fewer (24.2 in 1988–90 vs. 21.5 in 2009).

### 2.5. Factors related to insurance and use of oral health care

Several studies have identified the factors affecting oral health care utilization and especially the importance of dental insurance in the demand for and utilization of oral health care services (Sintonen and Linnosmaa, 2000; Suominen-Taipale, 2000; Stoyanova, 2004).

The expense of oral health care makes many people avoid dental visits (Bagewitz et al., 2002; Macek et al., 2004). Consequently, cost-sharing schemes through third party or health insurance have attempted to reduce or remove cost barriers and to ease the access to oral health care (Furino and Douglass, 1990; Damiano et al., 1990; Eklund, 2001). Since financial barriers were eased or removed, out-of-pocket expenses were reduced and the buying power of users was improved, perceived needs could be more easily transformed into expressed need or demand (Penchansky, 1981; Furino and Douglass, 1990).

#### 2.5.1. Insurance status and demand for oral health care

Both individuals and service providers can substantially influence demand for and utilization of oral health care (Parkin and Yule, 1988). As a financial factor of the health care system, the
<table>
<thead>
<tr>
<th>Type of provider</th>
<th>Setting</th>
<th>Funding</th>
<th>Eligibility</th>
<th>Personnel</th>
<th>Payment</th>
<th>Type of services</th>
<th>Reimbursement to dentist</th>
</tr>
</thead>
<tbody>
<tr>
<td>MHME¹</td>
<td>PDCs²</td>
<td>Government budget</td>
<td>Everyone</td>
<td>Dental therapists</td>
<td>80-90% subsidization for target population³</td>
<td>Examination, scaling, simple fillings, extractions, fissure sealants, fluoride therapy</td>
<td>Salary</td>
</tr>
<tr>
<td>Public insurance</td>
<td>Clinics owned by public insurance</td>
<td>Premium: 70% by the employer (government), 30% by the employee</td>
<td>Employed people with their family (50% of Iranian population)</td>
<td>Dentists hired by public insurance</td>
<td>Free of charge</td>
<td>Examination, radiography, scaling, simple fillings, extractions, full dentures</td>
<td>Salary</td>
</tr>
<tr>
<td>Commercial insurance</td>
<td>Private and public clinics contracted with public insurance</td>
<td>Premium: by the employer as fringe benefits</td>
<td>Employed people with their family (10% of Iranian population)</td>
<td>Private dentists contracted by commercial insurance</td>
<td>80-90% subsidization</td>
<td>All oral health care services</td>
<td>Fee-for-service</td>
</tr>
<tr>
<td>Private sector</td>
<td>Private clinics</td>
<td>Directly out-of-pocket</td>
<td>All people</td>
<td>Private dentists</td>
<td>FOP⁴</td>
<td>All oral health care services</td>
<td>Fee-for-service</td>
</tr>
</tbody>
</table>

¹ Ministry of Health and Medical Education  
² Public Dental Clinics  
³ children up to 12, pregnant and lactating mothers  
⁴ Fully out-of-pocket
presence of dental insurance, meaning third-party payment, is positively related to an increase in the demand for, and utilisation of, oral health care (Bendall and Asubonteng, 1995; Brennan et al., 1996; So and Schwarz, 1996; Manski, 2001; Abraham et al., 2003; Slack-Smith and Hyndman, 2004).

An insurance scheme raises oral health care demand through two mechanisms: It lowers the price for oral health care and raises the consumers’ effective income by enhancing their buying power (Grembowski et al., 1988). In other words, it influences patients’ purchasing power for oral health care (McDermott, 1986). Variables like dental attendance and the reason for the visit should be regarded as measures of demand (So and Schwarz, 1996), since it is the users who determine the action. Although adverse selection may explain some of the differences in dental attendance between insured and non-insured subjects, it is likely that the insurance coverage is a dominant predictor of dental attendance (Manski, 2001). It has been shown that insured persons are more likely to report frequent visits (Manning et al., 1985; Locker and Leake, 1993; Brennan et al., 1996) and to have frequent check-ups (Newman and Gift, 1992; Lang et al., 1994; Woolfolk et al., 1999; Sohn and Ismail, 2005) than are the non-insured.

2.5.2. Insurance status and utilization of oral health care

Cost sharing is expected to exert an influence on the quantity of the health care services consumed (Chalkley and Robinson, 1997; Nguyen, 2008). The findings from the Rand Health Insurance Experiment in the USA (Manning et al., 1985) have quite clearly shown that as the amount the patient has to pay decreases, the use of oral health care increases. Those who were randomly assigned to care with no co-payment (free care) used the most care. Those who reported having dental insurance also received more oral health care services than did those who had no insurance (Jack and Bloom, 1988; Gift, 1997).

Patient’s acceptance of the best treatment plan is directly related to the availability of a financial subsidy to pay for the treatment (Harr, 2002). Coverage levels of dental insurance are assumed to affect the amount and the mix of care services consumed (Mueller and Monheit, 1988). Insured patients receive more preventive care, crown and bridge, and endodontic treatment and less dental extraction (Brennan and Spencer, 2002; 2005; Sweet et al., 2005; Brennan et al., 2008). In Denmark, during the period 1975–1990, a new utilization pattern, consisting predominantly of diagnostic/preventive oral health care services, replaced the previous pattern which contained predominantly restoration/extraction services (Schwarz, 1996)

2.5.3. Acceptability of oral health care

Since today’s patients are well informed of health issues, highly aware of their rights, and increasingly concerned about the quality of care they receive (Douglass and Sheet, 2000), dental providers must carefully consider all expectations of their present and forthcoming patients in order to maintain a successful practice (Tickle et al., 1998).

Patients generally assess and express acceptability of service, technical and interpersonal factors, and service fees by defining what is desirable or undesirable, and by expressing satisfaction or dissatisfaction with the care they received to indicate their perception of the dentist and the services she/he provides (Hashim, 2005).
Patients’ assessment of oral health care services is a complex process that relies on their knowledge and expectations (Goedhart et al., 1996; Newsome and Wright, 1999b; Nguyen and Häkkinen, 2006). Patients’ expectations are based on their experiences, environment, socio-demographic background, and personality (Lahti et al., 1992; Freeman, 1999 a; b). In addition, characteristics of the health care delivery system affect patients’ assessments (Newsome and Wright, 1999b; Skaret et al., 2005).

The patient does not have sufficient expertise to evaluate the extent and quality of the services supplied. The supplier therefore plays two roles: to act as the patient’s advisor and to offer health care. In his/her role as advisor, all dentists should supply services based on oral health evaluation and social status and patient costs, regardless of their private economic interest (Grytten, 2001a).

Several studies in developed countries have reported details of dental insurance schemes and their impacts on oral health care. Such studies are rare in developing countries, usually with treatment-oriented health care delivery systems which may discourage regular use of oral health care services. Patterns of adults’ behaviour for receiving care according to insurance status may thus differ from those in developed countries with prevention-oriented health insurance schemes.
3. AIMS OF THE STUDY

3.1. General aim

The study aim was to determine the relationship between insurance status and utilization and characters of oral health care and to identify factors related to insured patients’ selection of dental clinic/dentist, among adults in Tehran, representing the capital of a country (Iran) with a developing oral health care system.

3.2. Specific aims

To determine
1. dental attendance according to insurance status (I).
2. the reasons for dental visits according to insurance status (II).
3. the relationship between insurance status and type of services received (IV).
4. why insured adults select fully out-of-pocket-paid services instead of using subsidized services to which they are entitled (III).

3.3. Hypotheses

Working hypotheses of the study are:

a) Adults with dental insurance are more likely to attend a dentist, to have regular dental check-ups, and to use more oral health care services than are those with no insurance coverage.

b) Having dental insurance has an impact on type of services received by dentate adults.

c) Despite an opportunity to use free or highly subsidized services, insured individuals may find other factors more important, and select a private dentist and pay in full out-of-pocket.
4. MATERIALS AND METHODS

The present study is a part of a joint program between the University of Helsinki, Finland, and Shaheed Beheshti Medical University, Iran, initiated by WHO (EMRO) in 2002.

4.1. Conceptual framework

The conceptual framework for this study is based on several models attempting to integrate factors explaining the use of oral health care services that treat the decision-making process of utilization as a multi-stage process (Grembowski et al., 1989; Kiyak, 1993; Daly, 2002a). Some of the important elements from these models comprise need for care, age, gender, education, attitudes, income insurance converge, distance and travel time, and waiting time for health services. These elements are categorized as demographic factors, attitude towards dentist, access to care, and health status (Gift, 1997). In the context of a personal-environment model of oral health, use of services is influenced by patient characteristics and characteristics of the oral health care delivery system (Kiyak, 1993). The broadest model for utilizing health services is the social-psychological model (Andersen and Nyman, 1973). Regarding sociological models, the present study’s framework is based on an individual’s predisposing and enabling factors, and also on characteristics of the health care delivery system (Figure 2). According to this framework, use of professional oral health care performed by a dentist is influenced by those factors related to perceived need and affecting demand for and utilization of oral health care. Based on this framework, dental insurance may enlarge the demand for oral health care and result in greater utilization of services.

In the present study, demand for oral health care services is measured by dental attendance and the reason for the visit, and utilization is measured by number of dental visits and type of service received in the most recent dental visit.

4.2. Sampling method and data collection

4.2.1. Design and sampling

The present study was carried out based on cross-sectional data obtained through phone interviews. The Iranian Centre for Dental Research granted ethical approval for the present study. The target population included adults (18 years and older) who were residents of Tehran, Iran, and had access to a fixed telephone line. Of all 8 million Tehran residents, 4.6 million were from 18 to 45 years of age. As the only such company in Tehran, the Telecommunication Company (TTC) provides a fixed line to a total of 1.7 million households, which is 90% of all households, the total number of fixed lines being 3.7 million (TTC, 2004). TTC services are divided into 400 sub-regions, each having a unique three-digit prefix code followed by a four-digit running number.

A pilot study was carried out on 100 adults in February 2005 in Tehran to determine the feasibility of the sampling method and the relevance of the questionnaire. The calculation of the sample size, based on around 50% prevalence for “having insurance coverage” among the target population, with a 5% error and 95% confidence interval, resulted in 1068 subjects. The pilot study revealed that only one out of three calls reached a person belonging to the target group. Based on this, 3200 phone numbers were considered as giving the estimated number of
Requests for care (Demand)
- Dental attendance (Study I)
- Reason for visit (Study II)

Amount of services received.
- Number of dental visits (Study II)
- Type of service received (Study IV)

Access to health insurance
- Insurance status

Acceptability of service
- Reason to select a clinic/dentist (Study III)

Socio-Demographic characteristics
- Age, Gender, Culture, Education

Attitudinal beliefs

Predisposing factors

Perceived need
- Expressed need
- Demand

Enabling factors

Community-related
- Health service facilities

Family-related
- Income, health insurance

Utilization of oral health care services

Oral health care delivery system
- Availability
- Accessibility
- Affordability
- Acceptability

Access to health insurance
- Measurement:
  - Insurance status

Acceptability of service
- Measurement:
  - Reason to select a clinic/dentist (Study III)
subjects in the final sample. A list of four million computerized options as seven-digit numbers resembling real phone numbers was created. Then, 3200 numbers were randomly selected, eight sets for each of the 400 three-digit prefix codes.

4.2.2. Phone calls

In the present study, prior to the interview, eight dental nurses were carefully instructed about a structured questionnaire, under the guidance of one dentist. Calibration of interviewers aimed at ensuring uniform understanding, and reliable selection of the options by all interviewers, and at ensuring that each interviewer could perform the interview consistently. This training and calibration lasted one week. Finally, four interviewers were selected according to how they adopted the interviewing and recording methods. These four trained interviewers, each using a list of 800 phone numbers, made the calls which took place in the mornings, afternoons, and evenings from 14 May to 14 July 2005. The outcome of each successful call was recorded as the duration of the interview and of a missed call as the reason for failure (busy, no answer, fax, and nonexistent lines). After five attempts, a busy or non-answering line was omitted from the list. In total, 1669 phone numbers were unavailable, most because of being from a nonexistent line or fax. Of those 1531 subjects who answered the calls, 221 refused to participate because of being at work or busy at that moment, and 224 were less than 18 years. In total, 1086 adults answered the questions.

4.2.3. Interviewing and questions

Each interview lasted an average of 15 minutes and was carried out with the use of a structured questionnaire with fixed and open-ended questions. The questions were based on recent related studies (RAND, 1982; Chen et al., 1997; Suominen-Taipale, 2000; Gürdal et al., 2000; Hill et al., 2003; Tseveenjav, 2004; Skaret et al., 2005), and were slightly modified after the pilot study. The questionnaire covered respondents’ demographic and socio-economic background, characteristics of dental visits, and the respondent’s reason for selecting a particular clinic.

Demographic and socio-economic background covered gender, age, level of education, income, and insurance status. Date of birth, calculated as the respondent’s age to the nearest year, was later categorized as 18–24, 25–34, 35–44, and 45 years and older. Table 3 shows a comparison by gender of the respondents’ age profile with that of the corresponding population, indicating that their age pattern approximates the age distribution of the target population.

Level of education was recorded with eight options, later combined into three: low (illiterate, primary or secondary school), medium (high school or diploma), and high (any university education).

Family income was inquired with the open question “How much is your monthly household income?” The answers were recorded in Rials (10 000 Rials=1.15 USD in 2005) and then categorized as 1) low (under the poverty line; less than 2 million Rials), 2) medium (2–5 million Rials), and 3) high (more than 5 million Rials), according to the ranking by the Central Bank of Iran (2005); 27% refused to disclose their level of income.

Insurance status was recorded as 1) no insurance, 2) public insurance or 3) commercial insurance. These options were treated both as three categories and as a dichotomy of insured and non-insured subjects. Respondents’ awareness of their insurance coverage was recorded as
five options, later dichotomized as being aware or unaware.

Characteristics of dental visits covered “time elapsed since and reason for the most recent dental visit”, “the number of dental visits within the past 12 months”, and “types of service received”.

Table 3. Distribution (%) of adult respondents (R) and population (P) by age and gender, in Tehran, Iran.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Men</th>
<th>Women</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R P¹</td>
<td>R P¹</td>
<td>R P¹</td>
</tr>
<tr>
<td>18 – 24</td>
<td>29 29</td>
<td>26 29</td>
<td>28 29</td>
</tr>
<tr>
<td>25 – 34</td>
<td>37 33</td>
<td>33 33</td>
<td>34 34</td>
</tr>
<tr>
<td>35 – 44</td>
<td>23 26</td>
<td>29 26</td>
<td>26 26</td>
</tr>
<tr>
<td>45+</td>
<td>11 10</td>
<td>12 11</td>
<td>10 10</td>
</tr>
<tr>
<td>n</td>
<td>469 2,344¹</td>
<td>617 2,260¹</td>
<td>1086 4,600¹</td>
</tr>
</tbody>
</table>

¹ Statistical Centre of Iran, 2004
²/1000

Based on the respondent’s answer to the question “When was your most recent dental visit?” the interviewer marked one option on a list of seven options, later dichotomized into within the past 12 months and more than 12 months ago.

The reason for the last dental visit was recorded as a check-up, a problem with teeth or gums, or continuing treatment. Those (n=17) who said that they were continuing their treatment were combined with the group having a problem with teeth or gums. Consequently, the reason for the dental visit was dichotomized as check-up or problem.

The number of dental visits within the past 12 months was recorded as: no visit, 1, 2, 3, 4 and more, and “do not remember”. The latter option with very rare cases (1.3%) was taken as no visit. For the cross-tabulation, number of visits was categorized as: 0, 1, 2 or more.

Type of oral health care service received during the most recent visit was classified (ADA Schedule of oral health care services, 1992) into 1) Diagnostics (examination, prescription, or radiographs), 2) Prevention (scaling or dental prophylaxis), 3) Restoration (amalgam or resins fillings), 4) Extraction, 5) High-technique care (surgery procedures, orthodontics, endodontics, crowns/bridges).

The location of the most recent dental visit was recorded: public clinic, contracted clinic, or private clinic without contract. These indicated the patients’ choice of care and were dichotomized as free or highly-subsidized services (FHS) or fully out-of-pocket-paid services (FOP). FHS included public clinics and contracted clinics and FOP, private clinics.
Reasons for selecting a clinic were recorded: 1) convenient access (convenient office hours, convenient location, “I know only this clinic”, short waiting time), 2) good technical aspects (high-quality services, or up-to-date equipment and materials, good infection control, dentist’s high-quality skill, or modern clinic), 3) good interpersonal aspects (respectful dentist, friendly personnel), 4) low or reasonable fees (free-of-charge services, reasonable fees, being a contracted clinic), 5) recommendation by a friend.

For those insured respondents who were aware of their dental insurance benefits, even though they paid FOP, the reasons for the selection were categorized as; 1) no coverage for this service, 2) low quality of service, 3) knowing a dentist, 4) inconvenient access (crowded clinic, inconvenient location, long waiting time).

4.3. Statistical methods

Data were analysed with the statistical software SPSS, Windows version 15. Descriptive statistics included the proportions/frequencies, means, standard deviations, and 95% confidence intervals. Differences between the subgroups were evaluated by the Chi–square test for frequencies and by ANOVA for mean values. The strength of the factors related to dental attendance, check-up, choice of fully out-of-pocket-paid services, and factors related to each type of service were evaluated by fitting a logistic regression model to the data and by calculating the corresponding odds ratios (OR) and their 95% confidence intervals (95% CI). Goodness of fit was evaluated by means of the Hosmer and Lemeshow test.
5. RESULTS

5.1. Description of respondents

Of all 1086 respondents, 57% were women, 62% were under age 35, 46% had a medium and 34% a high level of education, 13% were under the poverty line (low-income), and 70% reported as having insurance coverage, 64% by the public, and 6% by commercial insurance.

Age distribution was similar for men and women (p=0.13). Subjects’ mean age was 32.3 years (SD=10.7; median 31.0: 95% CI=32.2–33.5), for men 31.7 years and for women 33.0 years (p=0.06). Figure 3 shows distribution of the respondents according to their demographic and socio-economic background separately for men and women.

Figure 3. Distribution (%) of respondents according to their demographic and socio-economic background, separately for men (n=469) and women (n=617), in Tehran, Iran, 2004. Statistical evaluation for differences according to gender (between genders) by chi-square test.

5.2. Insurance status

Figure 4 shows percentages of insured respondents (n=759) according to their demographic and socio-economic background. Of the insured respondents, 59% were women, 60% were under age 35, 18% had a low level of education, and 13% a low income.

Having insurance coverage was more likely for women (OR=1.5), for those in the oldest age group (OR=2.0), and for those with a high level of education (OR=2.5) compared to men, to those in the youngest age group, and to those with a low level of education. Those subjects who refused to disclose their household income were less likely (OR=0.5) to have any insurance (IV).

Figure 4. Percentages of insured respondents (n=759), according to their demographic and socio-economic background, in Tehran, Iran 2004. Statistical evaluation for differences according to insurance status (between insured) by chi-square test.
5.3. Dental visits and treatment received by respondents’ characteristics

Of all respondents, 52%, and more women than men (54% vs. 48%; p=0.03) reported having had a dental visit within the past 12 months (I). The vast majority (84%) reported problems with their teeth as the reason for their most recent visit; only 16% had visited a dentist for a check-up (II). Figure 5 shows percentages of those reporting a check-up as the reason for most recent visit, according to their demographic and socio-economic background.

Figure 5. Percentages of adults (n=1019), reporting a check-up as the reason for their most recent visit, according to their demographic and socio-economic background, separately for men (n=429) and women (n=590), in Tehran, Iran, 2004. Statistical evaluation by means of the chi-square test for differences according to gender within each of the background aspects.

Having at least one dental visit within the past 12 months was more likely for women (OR=1.4), for those with a medium (OR=1.5) or high (OR=1.9) level of education, and for those with commercial insurance (OR=2.0) compared to men, those with a low level of education or income, and those with no insurance (I).

Of all respondents, 22% reported having had one visit and 30% two or more visits within the past 12 months. Reporting at least two visits was more common among those with a high level of education or income, and for those with insurance coverage. Number of visits was slightly higher for women than men (II). Figure 6 shows distribution of 1086 respondents according to their visit frequency within the past 12 months.

Figure 6. Distribution of respondents (n=1086) according to number of dental visits within the past 12 months by subjects’ demographic and socio-economic background, in Tehran, Iran, 2004. Statistical evaluation by means of the chi-square test for differences according to background.

Having at least one dental visit within the past 12 months was more likely for women (OR=1.4), for those with a medium (OR=1.5) or high (OR=1.9) level of education, and for those with commercial insurance (OR=2.0) compared to men, those with a low level of education or income, and those with no insurance (I).
For the 1001 dentate subjects, restorative treatments were the most frequently (48%) and preventive care the least frequently (8%) reported types of services (IV). Figure 7 shows percentages of dentate subjects who reported each type of dental service as received during their most recent dental visit according to their demographic and socio-economic background.

![Figure 7](image)

**Figure 7.** Percentages of dentate adults (n=1001) reporting each type of oral health care service as received at their most recent dental visit, according to their demographic and socio-economic background, in Tehran, Iran, 2004.

### 5.4. Dental visits and treatment received by insurance status

Respondents’ dental visit characteristics by insurance status and type of insurance are shown in Table 4. Of those with dental insurance, 54% reported having had a dental visit within the past 12 months; more often these were those with commercial insurance in comparison with public (65% vs. 53% p<0.001). Of all respondents, 6% said they had never visited a dentist, those non-insured saying so more often than those insured (10% vs. 4% p<0.001).
Table 4. Distribution (%) of respondents according to their dental visit characteristics separately by insurance status and type of insurance in Tehran, Iran, 2004.

<table>
<thead>
<tr>
<th>Characteristics of dental visit</th>
<th>All respondents</th>
<th>Non-insured</th>
<th>Insured</th>
<th>Public insurance</th>
<th>Commercial insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=1086</td>
<td>n = 327</td>
<td>n =759</td>
<td>n = 693</td>
<td>n = 66</td>
</tr>
<tr>
<td>Dental visit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within the past 12 months</td>
<td>52</td>
<td>46</td>
<td>54</td>
<td>53</td>
<td>65</td>
</tr>
<tr>
<td>Within 2 or more years</td>
<td>42</td>
<td>44</td>
<td>42</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td>No visit</td>
<td>6</td>
<td>10</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>p-values</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason to visit a dentist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check-up</td>
<td>16</td>
<td>13</td>
<td>16</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>Problem</td>
<td>84</td>
<td>87</td>
<td>82</td>
<td>84</td>
<td>72</td>
</tr>
<tr>
<td>Data missing(^2) (n=67)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-values</td>
<td>0.05</td>
<td></td>
<td></td>
<td></td>
<td>&lt;0.001(^1)</td>
</tr>
<tr>
<td>No. of dental visits within the past 12 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No visit</td>
<td>48</td>
<td>54</td>
<td>46</td>
<td>47</td>
<td>35</td>
</tr>
<tr>
<td>One</td>
<td>23</td>
<td>24</td>
<td>23</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Two or more</td>
<td>29</td>
<td>22</td>
<td>31</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>p-values</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td>0.01(^1)</td>
</tr>
<tr>
<td>Type of oral health care services received</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Preventive</td>
<td>8</td>
<td>7</td>
<td>9</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Extraction</td>
<td>15</td>
<td>20</td>
<td>12</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Restoration</td>
<td>48</td>
<td>45</td>
<td>50</td>
<td>51</td>
<td>37</td>
</tr>
<tr>
<td>High technique</td>
<td>17</td>
<td>16</td>
<td>17</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Data missing(^3) (n=85)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-values</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
<td>0.02(^1)</td>
</tr>
</tbody>
</table>

Statistical evaluation by means of Chi square test. \(^1\)Within type of insurance. \(^2\)Never visited a dentist. \(^3\)No visit or edentulous.

The highest rates for check-ups as the reason for the most recent visit occurred among commercially insured subjects (28%) compared with public (16%) or with those non-insured (13% p<0.001). Having had two or more dental visits within the past 12 months was most common among insured respondents, when compared with the non-insured (31% vs. 22% p=0.01). The non-insured respondents reported tooth extractions almost twice as frequently as did the insured (p<0.001).
Factors related to dental visit characteristics are explained by means of logistic regression analysis (Table 5). Those with commercial insurance coverage had higher odds for dental attendance within the past 12 months (OR=2.0), for reporting a dental check-up (OR=2.6) as a reason for the most recent dental visit, or for reporting two or more dental visits within the past 12 months (OR=1.8).

Table 5. Factors related to dental visit, dental check-up, number of dental visits, and types of oral health care service received, separately for each variable, as explained by means of logistic regression models fitted to data on adults in Tehran, Iran, 2004.

<table>
<thead>
<tr>
<th>Demand-related aspects</th>
<th>Utilization-related aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regularity of visit</td>
</tr>
<tr>
<td></td>
<td>Dental visit</td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
</tbody>
</table>

Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>1.4 (1.1–1.8)**</td>
<td>1.2 (0.8–1.7)</td>
<td>1.4 (1.0–1.9)*</td>
<td>Ref</td>
</tr>
<tr>
<td>Men</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>1.1 (0.8–1.7)</td>
</tr>
</tbody>
</table>

Age

<table>
<thead>
<tr>
<th>Age</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–24</td>
<td>1.5 (1.0–2.3)</td>
<td>3.0 (1.4–6.3)***</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>25–34</td>
<td>1.8 (1.2–2.9)**</td>
<td>2.3 (1.1–4.7)**</td>
<td>1.1 (0.7–2.0)</td>
<td>1.3 (0.8–2.2)</td>
</tr>
<tr>
<td>35–44</td>
<td>1.4 (0.9–2.2)</td>
<td>1.3 (0.6–2.7)*</td>
<td>1.5 (0.9–2.5)</td>
<td>1.0 (0.6–1.8)</td>
</tr>
<tr>
<td>45+</td>
<td>Ref</td>
<td>Ref</td>
<td>1.4 (0.8–2.2)</td>
<td>1.2 (0.6–2.3)</td>
</tr>
</tbody>
</table>

Level of education

<table>
<thead>
<tr>
<th>Level of education</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.4 (1.1–2.0)*</td>
<td>2.9 (1.4–5.8)**</td>
<td>2.0 (1.2–3.0)*</td>
<td>1.1 (0.7–1.8)</td>
</tr>
<tr>
<td>Medium</td>
<td>1.5 (1.0–2.2)*</td>
<td>3.6 (1.8–7.3)***</td>
<td>2.8 (1.7–4.5)**</td>
<td>Ref</td>
</tr>
<tr>
<td>High</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>2.8 (1.7–4.8)***</td>
</tr>
</tbody>
</table>

Household income

<table>
<thead>
<tr>
<th>Household income</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.6 (1.0–2.4)*</td>
<td>1.1 (0.6–2.1)</td>
<td>1.0 (0.6–1.7)</td>
<td>1.0 (0.6–1.7)</td>
</tr>
<tr>
<td>Medium</td>
<td>2.1 (1.4–3.2)**</td>
<td>1.2 (0.6–2.2)</td>
<td>1.3 (0.8–2.2)</td>
<td>1.4 (0.8–2.3)</td>
</tr>
<tr>
<td>High</td>
<td>1.4 (0.9–2.1)</td>
<td>1.4 (0.7–2.7)</td>
<td>1.0 (0.6–1.6)</td>
<td>Ref</td>
</tr>
</tbody>
</table>

Type of insurance

<table>
<thead>
<tr>
<th>Type of insurance</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-insured</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>2.4 (1.0–6.0)*</td>
</tr>
<tr>
<td>Public insurance</td>
<td>1.2 (0.9–1.6)</td>
<td>1.3 (0.8–2.0)</td>
<td>1.3 (0.9–1.8)</td>
<td>1.5 (0.6–4.0)</td>
</tr>
<tr>
<td>Commercial insurance</td>
<td>2.0 (1.2–3.6)*</td>
<td>2.6 (1.3–5.0)**</td>
<td>1.8 (1.0–3.3)*</td>
<td>Ref</td>
</tr>
</tbody>
</table>

Goodness of fit

| Goodness of fit | 0.65 | 0.44 | 0.83 | 0.24 |
| Pseudo-R squared | 0.06 | 0.08 | 0.07 | 0.08 |

1All respondents (n=1086). 2Those who had visited a dentist (n=1019).
3Dentate respondents who had visited a dentist (n=1001).
4Hosmer and Lemeshow test. 5Nagelkerke R Square. *p<0.05. **p<0.01. ***p<0.001

Regarding each type of treatment, logistic regression models revealed that subjects’ insurance status made a difference only in receiving extractions. Reporting extraction as a service received was more likely for those subjects with a low level of education (OR=2.8), with a low level of income (OR=2.2), or for those with no insurance coverage (OR=2.4).
Factors related to dental visit characteristics for insured adults were explained by means of logistic regression analyses (Table 6). Among insured subjects, dental attendance was more likely for women (OR=1.4), for those in younger age groups: 18- to 24-year-olds (OR=1.7), 25- to 34-year-olds (OR=1.9), and for those with a medium (OR=1.6) or high (OR=1.9) household income.

Table 6. Factors related to dental visit, dental check-up, number of dental visits and the type of oral health care service received, as explained separately for each aspect by means of logistic regression models fitted to the data on insured adults (n=726) in Tehran, Iran, 2004.

<table>
<thead>
<tr>
<th>Demand-related aspects</th>
<th>utilization-related aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regularity of visit</td>
<td>Reason to visit</td>
</tr>
<tr>
<td>Dental visit</td>
<td>Dental check-up</td>
</tr>
<tr>
<td>Frequency of visit</td>
<td>2 and more visit</td>
</tr>
<tr>
<td>Type of service</td>
<td>Extraction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>1.4 (1.0–1.9)*</td>
<td>1.1 (0.7–1.7)</td>
<td>1.5 (1.0–2.1)</td>
<td>Ref</td>
</tr>
<tr>
<td>Men</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>1.2 (0.7–1.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–24</td>
<td>1.7 (1.0–2.8)*</td>
<td>3.3 (1.4–7.5)**</td>
<td>1.0 (0.6–1.8)</td>
<td>1.0 (0.5–2.4)</td>
</tr>
<tr>
<td>25–34</td>
<td>1.9 (1.2–3.1)**</td>
<td>2.5 (1.1–5.6)*</td>
<td>1.5 (0.9–2.7)</td>
<td>1.0 (0.4–1.9)</td>
</tr>
<tr>
<td>35–44</td>
<td>1.5 (0.9–2.4)</td>
<td>1.2 (0.5–2.8)</td>
<td>1.4 (0.8–1.5)</td>
<td>1.0 (0.5–2.2)</td>
</tr>
<tr>
<td>45+</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of education</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>3.3 (1.7–6.5)***</td>
</tr>
<tr>
<td>Medium</td>
<td>1.3 (0.9–2.1)</td>
<td>2.9 (1.2–7.0)*</td>
<td>2.4 (1.4–4.9)**</td>
<td>1.2 (0.6–2.1)</td>
</tr>
<tr>
<td>High</td>
<td>1.4 (0.9–2.3)</td>
<td>3.5 (1.5–8.4)**</td>
<td>3.2 (1.8–6.0)***</td>
<td>Ref</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household income</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
<th>OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td>1.4 (0.6–3.3)</td>
</tr>
<tr>
<td>Medium</td>
<td>1.6 (1.0–2.7)*</td>
<td>1.0 (0.5–2.1)</td>
<td>1.1 (0.7–2.0)</td>
<td>1.4 (0.7–2.8)</td>
</tr>
<tr>
<td>High</td>
<td>1.9 (1.2–3.3)**</td>
<td>1.0 (0.5–2.0)</td>
<td>1.3 (0.8–2.4)</td>
<td>2.1 (1.0–4.3)*</td>
</tr>
<tr>
<td>No answer</td>
<td>1.2 (0.7–2.1)</td>
<td>1.0 (0.5–2.3)</td>
<td>1.0 (0.6–1.8)</td>
<td>Ref</td>
</tr>
</tbody>
</table>

| Goodness of fit¹   | 0.90       | 0.20       | 0.90       | 0.44       |
| Pseudo-R squared⁵  | 0.04       | 0.08       | 0.07       | 0.04       |

¹Insured respondents (n=759). ²Those insured who had visited a dentist (n=726). ³Dentate insured respondents who had visited a dentist (n=710). 4Hosmer and Lemeshow test. ⁵Nagelkerke R Square. *p<0.05. **p<0.01. ***p<0.001.

Those in younger age groups, i.e. 18- to 24-year-olds (OR=3.3), 25- to 34-year-olds (OR=2.5), and those with a medium (OR=2.9) or high (OR=3.5) level of education were more likely to report a check-up as the reason for their most recent visit. Reporting two or more dental visits was more likely for those with a medium (OR=2.4) or high (OR=3.2) level of education. Among insured respondents, reporting extraction as received resulted in greater odds for those with a low level of education (OR=3.3).
5.5. Choice to pay for oral health care

Of all 726 insured subjects, 60% selected fully out-of-pocket-paid services (FOP), whereas 40% selected free or highly-subsidized (FHS) care during their last visit to a dentist, the publicly insured doing so more often than did those with commercial insurance (63% vs. 34%, p<0.001). Higher rates for selecting FOP appeared among women (p=0.01) and among those with high levels of education and income (p<0.001) compared with men, and those with low levels of education and income. Of all subjects, 382 (53%) were unaware of their insurance benefits; among them 32% belonged to the youngest age group, 43% had a medium level of education, and 30% had a medium level of income with no statistically significant differences compared with those who were aware of their benefits. Among those 344 who were aware, 42% selected FOP, the highest rates being for men, for those with a high level of education or income, and for those having public insurance.

Among those 145 who were aware of their benefits and who still selected FOP, 11% reported as their reason for not selecting subsidized oral health care that “the treatment was not covered by the insurance scheme”, 44% named “low quality of service”, 21% “factors related to the dentist”, and 24% “inconvenient access” (III).

<table>
<thead>
<tr>
<th>Reasons</th>
<th>All</th>
<th>Aware</th>
<th>Unaware</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All FOP1</td>
<td>FHS2 FOP1</td>
<td>FHS2 FOP1</td>
</tr>
<tr>
<td></td>
<td>n=437</td>
<td>n=289</td>
<td>n=145</td>
</tr>
<tr>
<td>n (%)</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Convenient access</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good technical aspect</td>
<td>134 (18)</td>
<td>18 19</td>
<td>15 16</td>
</tr>
<tr>
<td>p-value</td>
<td>0.41</td>
<td>0.52</td>
<td>0.10</td>
</tr>
<tr>
<td>Good interpersonal aspect</td>
<td>326 (45)</td>
<td>50 37</td>
<td>57 37</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.03</td>
</tr>
<tr>
<td>Low or reasonable fee</td>
<td>252 (35)</td>
<td>47 17</td>
<td>53 19</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recommended by a friend</td>
<td>189 (26)</td>
<td>6 56</td>
<td>5 63</td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
| Statistical evaluation for differences according to selection to pay. Chi-square test. Percentages reported represent those who cited these reasons. ^Fully out-of-pocket paid care ^Free or highly-subsidized care The table used with permission from “John Wiley and Sons” publisher

Half of those who selected FOP cited good technical and interpersonal aspects as their reasons. In comparison, 56% of those who selected FHS cited low or reasonable fees, and 37%, good technical aspects (Table 7).
Factors related to a subject’s selection of FOP were explained by means of logistic regression analysis (Table 8). Among the reasons named, good interpersonal aspects (OR=4.6) was the strongest reason, and being unaware of dental insurance benefits (OR=4.6) was another prominent factor. Those citing good technical aspects as a reason had greater odds of selecting FOP (OR=2.3).

Table 8. Factors related to selection of fully out-of-pocket-paid care, as explained by means of a logistic regression model fitted to the data of insured adults (n=726) in Tehran, Iran, 2004.

<table>
<thead>
<tr>
<th>Reasons named</th>
<th>OR</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good interpersonal aspects (0=Not this reason, 1=Yes)</td>
<td>4.6</td>
<td>(2.8–7.6)*****</td>
</tr>
<tr>
<td>Good technical aspects (0=Not this reason, 1=Yes)</td>
<td>2.3</td>
<td>(1.4–3.6)*****</td>
</tr>
<tr>
<td>Convenient access (0=Not this reason, 1=Yes)</td>
<td>1.0</td>
<td>(0.6–1.8)</td>
</tr>
<tr>
<td>Low or reasonable fee (0=Yes, 1=Not this reason)</td>
<td>13.7</td>
<td>(8.1–23.2)*****</td>
</tr>
<tr>
<td>Recommended by a friend (0=Yes, 1=Not this reason)</td>
<td>1.4</td>
<td>(0.5–4.1)</td>
</tr>
</tbody>
</table>

**Insurance and awareness**

<table>
<thead>
<tr>
<th>Reason</th>
<th>OR</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of insurance (0=Commercial, 1=Public)</td>
<td>1.8</td>
<td>(0.8–3.8)</td>
</tr>
<tr>
<td>Awareness of insurance benefit (0=Aware, 1=Unaware)</td>
<td>4.6</td>
<td>(3.0–7.0)*****</td>
</tr>
</tbody>
</table>

**Socio-demographic factors**

<table>
<thead>
<tr>
<th>Factor</th>
<th>OR</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (0=Women, 1=Men)</td>
<td>1.3</td>
<td>(0.9–2.0)</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>1.5</td>
<td>(0.8–2.7)</td>
</tr>
<tr>
<td>High</td>
<td>1.8</td>
<td>(1.0–3.4)*</td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>2.0</td>
<td>(1.2–3.6)****</td>
</tr>
<tr>
<td>35-44</td>
<td>2.4</td>
<td>(1.3–4.1)****</td>
</tr>
<tr>
<td>45+</td>
<td>3.3</td>
<td>(1.6–6.8)****</td>
</tr>
</tbody>
</table>

Goodness-of-fit1                 0.15
Pseudo-R squared2                0.53

1Hosmer and Lemeshow test. 2Nagelkerke R Square. *p<0.05. **p<0.01. ***p<0.001.

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6. DISCUSSION

The majority of studies regarding demand for and utilization of oral health care services by insurance status have been conducted in developed countries, i.e. European countries, the USA, and Australia. Such studies in developing countries are rare, especially in the Middle East. To my knowledge, the present report seems to be the first one dealing with impacts of insurance on adults’ oral health care in a Middle-Eastern country.

6.1. Main findings

The present study revealed that dental insurance was positively related to demand for oral health care as well as to utilization of services, but related to the latter to only a minor extent. Those who were insured, particularly with commercial insurance, reported higher demand for oral health care services, higher frequency of visits, but no difference regarding to the type of service received except for extraction, which was more frequently reported by the non-insured respondents. On the other hand, among insured respondents, regardless of their opportunity to use fully or highly subsidized oral health care services, a good interpersonal relationship and high quality of service were the most important factors when an insured patient selected a clinic/dentist. Surprisingly, a considerable proportion of the respondents covered by an insurance scheme were unaware of their benefits, especially those with public insurance.

6.2. Demand for oral health care by insurance status

The high rates of demand for care among the present commercially-insured respondents are supported by reports from countries with private insurance schemes, with high rates of demand among those with insurance coverage (Grytten and Sørensen, 2000; Wall and Brown, 2003; Sohn and Ismail, 2005; Chapin, 2009; Manski, 2009). As described earlier, both the nature of financing and its degree of cost-sharing influence an individual’s decision to seek oral health care (Anderson et al., 1995). Findings from the RAND Health Insurance Survey in the USA, as reviewed by Bendall and Asubonteng (1995), have shown that oral health care services are significantly more responsive to cost-sharing than are other out-patient health services. Reducing the level of cost-sharing has significantly raised the demand for oral health care (Manning et al., 1985). In Iran, having commercial insurance as a fringe benefit from employers may lead to higher demand, particularly since insured people have to use up their benefits annually. Further, compared with publicly insured respondents, those commercially insured have a free choice to visit any contracted dentist. That means easy access to oral health care, which certainly has influenced demand among those respondents employed and having commercial insurance.

Despite significant differences between insurance status and rate of check-ups, that only 16% of respondents gave a check-up as the reason for their most recent visit seems surprising. In comparison with developed countries, this is far from the recommended way to use oral health care services (Beirne et al., 2005). Higher rates of dental visits for a check-up were reported from the Netherlands (Schouten et al., 2006), Finland (Suominen-Taipale, 2000), Germany (Federal Ministry of Health, 2007b), and the USA (Sohn and Ismail 2005; Chapin, 2009).

The behaviour of seeing a dentist for a check-up has its origins in childhood. The health policy and the characteristics of the health care system in a community create and maintain circumstances favorable to such behaviour. One important and effective way to promote this behaviour has
been school-based oral health care. Studies show that preventive behaviour seems to continue into adulthood (Anderson et al., 1995; Schwarz and Lo, 1996; Chen et al., 1997).

In countries with higher rates for dental check-ups, school-based oral health care programs have long been dominant (Birch and Anderson, 2005). In Iran, the public health services offer oral health care to school children up to 12 years of age since 1997 (Pakshir, 2004). Publicly provided oral health care does not include regular check-ups, and it seems that the service organization does not support the development of healthy behaviour; lack of regular check-ups during childhood may probably be reflected in the present adults’ behaviour. The present results support a recent recommendation given for Iran that school-based oral health care and oral health promotion programs focusing on development of health behaviour should be established and continued from primary schools up through high schools (Yazdani, 2009).

The recall of adults for regular check-ups also has an impact on an individual’s decision to contact a dentist (Sintonen and Maljanen, 1995; Hugoson et al., 1995; Grytten et al., 1996, Nguyen, 2008). Iran’s treatment-oriented system leads patients to visit a dentist only when they have trouble with their teeth or gums. This might also be due to the fact that Iranian dentists have not yet adapted a recall system.

While the relationship among those who have commercial insurance and report dental attendance is strong, this was not the case among the publicly insured individuals. This may result from real or perceived barriers. A recent USA study suggests that perceived need for health care, ability to access it, and attitudes toward its importance may explain differences in dental attendance between subjects with public insurance (Medicaid) and those with private insurance (Sweet et al., 2005). In the present study, the proportion of subjects with a low level of education or income is twice as high among the public- than among the commercially insured. Individual factors associated with a low education or income may lead to less understanding of the importance of oral health care (Sweet et al, 2005). Furthermore, low-income individuals do not have adequate financial resources to avail themselves of appropriate oral health care. Even through the actual fee for dental treatment may be paid through a third party, the “opportunity costs” to obtain that care may be such that they cannot afford the free care (Guay, 2004a). Surprisingly, more than half of those publicly insured in the present study were unaware of their dental benefits, which may well affect their perceived need and demand for care. The majority of those with commercial insurance were aware of their benefits (75%) because commercial insurance companies provide insured individuals with a list of dentists who are contracted by the insurance. In the public insurance scheme in Iran, no such information is provided to insured individuals.

The higher demand for oral health care among insured respondents in the present study might also be a result of individuals’ characteristics and their health behaviour rather than result from the insurance itself. Without considering individual’s health behaviour, the estimated effect of dental coverage benefit may overstate the true effect of insurance on demand for care.

6.3. Utilization of oral health care services by insurance status

While recent studies show that insurance coverage leads to increased use of oral health care services (Bailit and Beazoglu, 2008; Chapin, 2009), previous studies have reported no difference (Holst,1982) or a slight but insignificant increase (Locker et al., 1989) in utilization between the insured and non-insured. In the present study, reporting two and more dental visits was more frequent among the insured than the non-insured, but insurance status made
no difference regarding the type of services received except for tooth extractions, which were more frequently reported by the non-insured respondents.

According to the Anderson-Nyman model (1973), use of oral health care services as a part of health behaviour is related to an individual’s characteristics and the characteristics of the health care delivery system such accessibility of services.

Variation in the number of visits within the past 12 months showed that level of education is associated with utilization of services. In Iran, health insurance benefits are available only for those who are employed. Highly educated people are usually employed and tend to have higher incomes. This results in higher demand for and utilization of oral health care. In addition, people with higher education and income are more likely to have commercial dental insurance.

Common use of health care services among commercially insured persons might be a reflection of easy access to a contracted dentist or clinic. The dentist-population ratio has served as a criterion for evaluation of service availability and accessibility (Penchansky and Thomas, 1981; Grytten et al, 2001). A positive correlation exists between individual utilization of oral health care and the dentist-to-population ratio. In Iran’s insurance system, particularly in the public one, the dentist-population ratio (0.2:1000) is below that in those countries with a developed health insurance system; i.e. 1.3:1000 in Finland, or 0.8:1000 in Germany (WHO, 2006).

The low number of publicly owned clinics or contracted dentists in relation to the expansion of spread of population in the suburbs of the city and to the insufficient public transportation in Tehran indicates that accessibility to oral health care services would be challenging. In Finland, with developed public transportation, NHI also covers some transport costs. In addition, a strong point of NHI in developed countries is the role of the private sector in the provision of services. Half of all dentists in Finland are private practitioners and are contracted with the NHI (Widström and Eaton, 2004); in Germany, 85% of dentists work for the universal sickness insurance. More than 80% of Iranian dentists work in the private sector, and their contribution to public insurance service is minor, which probably results from the reimbursement mechanism and the low fees by the public insurance. Recent US studies have shown that a major obstacle for those with Medicaid is to find a dentist willing to provide care because of the low reimbursement rate (Mofidi, 2005; Parker, 2006). The fee for procedures in Iran’s public insurance scheme is approximately 50% lower than that in the private sector. Further, since the salary of publicly hired dentists is independent of the number of patients, there are no incentives to work hard.

Studies show that patterns of receiving oral health care services vary by conditions such as dental problems, socio-demographic status, and insurance coverage (Manning et al., 1985; Mueller and Monheit, 1988). Patients with dental insurance have received more preventive, diagnostic, restorative, and high-technique services and less extraction (Bader and Kaplan, 1983; Brennan and Spencer, 1999; 2006; Dental Practice Board, 2007). Regarding the policy of the health insurance system, the types of services differ. In Sweden and the USA, to promote preventive care, dental insurance schemes pay up to 100% of the cost of diagnostic and preventive services (Buhlin et al., 2003; Parker, 2006).

The relationship between being insured and undergoing fewer tooth extractions is in line with recent reports from developed countries (Sweet et al., 2005; Brennan and Spencer, 2006; Brennan et al., 2008). Fewer tooth extractions among those insured may reflect their better options for choice of treatment. In Iran, those who are insured receive their dental treatments with an 80%
to 100% subsidy, which may facilitate their choices as to maintaining dental health. Since most insured people in the present study had a medium or high level of education, this characteristic may have influenced insured patients’ attitudes toward better oral health through avoidance of tooth extractions. On the other hand, suppliers may have also influenced patients’ decision to receive services with higher fees, resulting in higher reimbursement for contracted private dentists with fee-for-service payment.

The present results show that regardless of insurance status, restorative treatments dominated, and preventive care was rather infrequent. This is consistent with data from countries where most dental treatment has been reported to involve a narrow range of services such as the USA (Bader, 1983), the UK (Dental practice board, 2007), and Australia (Brennan et al., 2008). In the present study, greater percentages of subjects reporting restorative treatments as received may be related to the greater occurrence of caries among Iranian adults, of whom 74% of 18-year-olds and 24% of the 35- to 44-year-olds have one or more decayed teeth, as shown recently (Hessari, 2009). In Iran, findings from national surveys and recent studies (Hessari, 2009, Saied-Moallemi et al., 2006, Yazdani et al., 2008) on Iranians’ oral health status and treatment needs are in line with the present findings indicating a high need for oral health care services among adults.

The high frequency of dental plaque among Iranian young adults, and the common finding of calculus in both young and middle-aged individuals (Hossein, 2009) is in line with the infrequent preventive care currently received by adults and indicates the inadequacy of the preventive programs in the Iranian oral health care system. Reorientation of oral health services towards prevention is one of the WHO’s priority actions for continuous improvement of oral health (Petersen, 2005). Insurance schemes should also support this emphasis on preventive care. Providing more preventive care may mean lower fees as income and thus affect dentists’ clinical decision-making. In Iran, dentists have reported positive attitudes towards preventive care (Ghasemi et al., 2007), which is a good starting point. At the same time, however, the dentists considered performing preventive measures as not economically beneficial. Such an attitude may have influenced dentists’ willingness to provide preventive treatments for the present respondents as well.

Frequency of visits, types of service, and amount of money spent on oral health care are among the measures of utilization (Bailit and Beazoglou, 2008). In the present study, due to lack of information, the relationship between utilization based on expenditures was not investigated. Nevertheless, the total expenditure on health care in Iran was 6.6% of GDP (WHO, 2004). According to the Iran National Health Account, 18% of health expenditure is covered by health insurance, 23% by the government, and the remaining 59% by the patient (Aljunid, 2001).

6.4. Factors related to patients’ choice to pay for oral health care

The fact that many insured patients prefer to pay out-of-pocket offers a challenge to the insurance system. In the present study, insurance coverage was strongly associated with level of education, due to the fact that insurance was available only for the employed. People with a high level of education have higher expectations of having a healthy dentition, which may indicate better knowledge of, positive attitudes towards, and higher value placed on dental health, and consequently may lead them to seek clinics where high quality oral health care services are expected to be supplied by skilled dentists.
A good interpersonal relationship and high quality of service were important factors for selecting FOP among the insured. The importance of a good dentist-patient relationship and good technical aspects as the reason for selecting a clinic/dentist in this study is in line with earlier reports for developed health care delivery systems (Lahti et al., 1992; Ter Horst and Witt, 1993; Bedi et al., 2005; Skaret et al., 2005). Patients may value an experienced dentist and believe that most dentists in the private sector have good experience and skill, and are thus motivated to provide high-quality care. According to a community-based study in UK (Calnan et al., 1999) which used dentist’s technical skills as one important criterion when assessing the quality of general oral health care, private patients reported a better quality of their oral health care than did the NHS patients. The same report stated as one of the reasons given by dentists for moving into private practice being their desire to spend more time with their patients. There seems to be a positive association in dentists’ perception between their time spent with patients and the quality of treatment. In addition, the private sector allows the patient the choice of a dentist and the location of a clinic and provides a wide range of care and possibly is also more apt to disseminate broad information of treatment choices.

In the present study, the subsidy schemes had a minor impact on patients’ choice of a public insurance benefit. As recently reported in the USA, an important aspect of oral health care service that has received little attention is the negative attitude and behaviour of some dentists and their staff towards publicly insured patients (Mofidi et al., 2002). The study notes that such patients faced what they perceived as judgmental, disrespectful, and discriminatory behaviour from the dentist and staff because of their publicly-insured status. A recent study from Finland (Nguyen and Häkkinen, 2006) indicates that the selection of a private dentist is associated with patients’ perception that public services are insufficient.

Their negative attitudes and the poor quality of oral health care services provided by dental practitioners have been cited as common reasons for lodging complaints and for changing dentists (O’Shea et al., 1986; Calnan et al., 1999; Harr, 2002). As suggested by the Federation Dentaire Internationale (1985), insufficient sensitivity to patients, their attitudes and needs is a barrier in the service system that dentists must consider in their practice. In the present study, publicly insured patients may believe that public services have a poor reputation and that dentists employed by public insurance on a fixed salary are not motivated to provide high-quality care. This was expressed by 44% of those insured patients who selected FOP even when they were aware of their own insurance coverage.

In Iran, insuring every employee is mandatory according to the labour Law, which resembles Germany’s universal sickness insurance. In some ways it is near the private health insurance in the USA, since in the commercial insurance scheme the employers pay the total premiums for the employees and their families (employer-sponsored), as a fringe benefit. However, the efficiency of the Iranian health insurance is different. Weak spots in the health insurance system in Iran include its triangular role by being the premium investor, distributor, and provider of services and also preparing the fee schedule without negotiation with the dentist or dental communities. In most of the developed countries, the fees are negotiated between the national dental association and the insurance authorities representing the state (Widström and Eaton, 2004). In addition, the insurance benefit is only for employees and their families.

In the present study, 27% of the Tehranian adults were non-insured. This is comparable with a finding in the USA, where 35% of the population has no dental benefits (Manski, 2009). In Finland, all permanent residents (Vuorenkoski, 2008) and in Germany, 90% of the population (Federal Ministry of Health, 2007b) are covered by NHI schemes.
Since insurance in Iran is employer-employee based, and only employed individuals are covered by health insurance, it could be assumed that more of those non-insured are unemployed or among the low-income population, who cannot afford such insurance. Those who most suffer from the lack of insurance are the most vulnerable (Parker, 2006). Several studies have shown that poor oral hygiene, oral diseases and unmet treatment needs are most common among those with a low family income. Therefore, accessibility, availability, and affordability of services for vulnerable people are the most important priorities of the health care system in all countries. Regarding the insurance coverage in Iran, a new policy, concerning especially the public insurance, is needed to cover vulnerable people.

Generally, the information available on the oral health care delivery system in Iran and the present findings show that in both governmental and insurance systems shortages exist in health care personnel and clinics, hampering the individual’s access to these services. Oral health status and treatment need among the Iranian population indicate an incapability of the oral health care delivery system in achieving its ultimate goal, which is a decent oral health status for the population.

Generally, preventive services applied by the dental profession alone are expensive and not as successful as expected. Consequently, there is a need for policy makers and insurance companies to adopt alternative ways to promote oral health. Such alternatives should not be dependent on individuals’ preferences or supplier-inducement and should also be accessible to the entire population. In this regard, community-based intervention such as water or salt fluoridation and fluoridated toothpaste are among the efficient strategies applied in many developed countries (NHMRC, 2010). Both public and commercial health insurance companies could play important roles in these programs, e.g. by allocating a part of the premium to such types of community-based interventions.

6.5. Methodological aspects

The four most common methods for data collection in community-based studies usually are utilization of the national health survey data bank, of a postal questionnaire, or a face-to-face or phone interview. In Iran, the Ministry of Health and Medical Education conducts a National Health Survey every four years (Samadzadeh and Hessari, 1999); this does not, however, include information useful to the present study. On the other hand, no data banks or reliable registers are available for health insurance, including data on dental aspects.

Primarily, the data for the present study were planned to be collected via dentists. Therefore, a questionnaire with a pre-paid envelope was sent as an enclosure in the Iranian Journal of Oral Health (2004) to about 3000 targeted dentists, but only 231 responded. Afterwards, the target population changed to lay people. However, among them, 6% were known to be illiterate (SCI, 2004). Therefore, the method of a postal questionnaire was rejected. Furthermore, use of a face-to-face interview was abandoned due to its time-consuming and expensive nature. The phone interview was selected as reliable and more do-able method.

The reasons for selecting the phone interview were also based on the low cost of the call, convenience for both the interviewers and respondents, easy access to the target population, and feasibility of collecting data in a reasonable time period. The validity of phone data collection for general and oral health has been verified (Douglas, 1999; Ezzati–Rice et al., 1997; Carter and Stewart, 2003). Phone communication has been an essential part of Iranian culture. According to the Iranian Central Bank (HBS, 2008), state revenues of the telecommunication ministry have ranked second after oil exporting.
For the phone interview method, three options were available: first collecting phone numbers from the Tehran Telecommunication Company (TTC), but its administrators refused to disclose the phone numbers. Second, to use the phone catalogue, but it included only those who are willing to pay an annual fee, and therefore includes only some of the customers. The third option was to select random numbers from the TTC prefixes for Tehran, published in its website (TTC, 2004).

The pilot study has shown that of every three selected phone numbers two were either not in use or were fax numbers. In order to achieve a final sample of 1086 respondents, which would be representative of Tehran’s adult population, a total of 3200 numbers had to be selected. This explains why 1669 invalid numbers were not reached and were excluded. The pilot study also showed that interviewees were more comfortable with women interviewers. Each interview lasted an average of 15 minutes, which appeared to be sufficient for answering all the questions.

In general, the population-based data, and well-developed telephone system in Tehran, the reasonable response rate and furthermore, the age pattern fitting fairly well the age distribution of Tehran adults (Table 2) speaks for the generalizability of the present findings.

When generalizing the results, one should keep in mind that the limitations imposed by the sampling required a fixed telephone line. This raises the possibility that those lacking a telephone line, and therefore outside the scope of the present data collection, may differ from the respondents in their use of oral health care services. The present results should be seen as a somewhat optimistic picture; the situation might be an overestimate rather than an underestimate of oral health care.

According to the present study, 52% of Tehran inhabitants visit a dentist annually. Compared to other cities in Iran, those living in Tehran have a higher employment rate and higher levels of education and household income. Earlier studies have demonstrated that people with a high or medium level of education care for their oral health and also follow general advice regarding regular visits for check-ups (Grossman, 1972; Manning et al., 1985; Thomson, 2001; Yu et al., 2001). In addition, income has also been related to demand for oral health care; higher income having a positive impact on such demand in Norway (Grytten et al., 1993). Furthermore, people with a low income may give a lower priority to oral health care than to other expenses that they perceive as being more pressing (Guay, 2004b).
7. CONCLUSIONS

Dental insurance has an impact on adults’ demand for oral health care. Having dental insurance as a factor to remove or reduce the cost of oral health care services resulted in a higher demand for oral health care.

Dental insurance had a slight effect on utilization of oral health care services, and it resulted in a higher frequency of dental visits among insured respondents. However, the treatment panorama differed: Only those with no insurance coverage received more extraction.

Iran with its developing health care system and treatment-oriented insurance schemes experiences a higher utilization of services when patients have trouble with their teeth or gums.

An individual’s characteristics are also related to demand for and utilization of oral health care services; women, people in younger age groups, and those with a higher level of education or income have a higher demand for and a higher rate of dental visits compared with those with low level of education or income. In this present study, insurance schemes were affordable only to the employed subjects that may have a better social status than do the unemployed.

Despite the opportunity to use free or highly-subsidized oral health care services, the importance of good dentist-patient relationships and a good technical quality of care led patients to select private dentists and to pay in full directly out-of-pocket.

For those publicly insured, the accessibility and availability of publicly owned clinics or contracted dentists seemed to be unfavourable, which may at least partly explain why many publicly insured subjects went to see a private dentist and were ready to pay FOP.

Regardless of the high number of dentists in the private sector, their contribution to the insurance scheme is minor, as such dentists/clinics are in short supply.

In Iran, both the public and commercial health insurance schemes cover only employed people and their families. Approximately 40% of the population is not covered by insurance schemes. Regarding the wide range of socio-economic background and the poor oral health status of unemployed people, achieving good oral health for the whole Iranian population remains a big challenge.
8. RECOMMENDATIONS

The present findings indicate a need to modify insurance systems to facilitate optimal use of oral health care services. The following changes are recommended:

For better access and availability of services

- There is a need for higher participation of private dentists to be under contract in the insurance scheme, particularly in a public scheme. To encourage dentists’ participation in an insurance scheme, re-organization of the payment mechanism should be considered. Payments that dentists receive for providing services must be appropriate in relation to their costs for providing those services. To approach this goal, the MHME should take the initiative to start negotiations regarding an up-to-date service fee schedule.
- Insured individuals should be provided with sufficient information on benefits regarding their right to use oral health care services

For ability to purchase oral health care services

Dental insurance coverage should be expanded to facilitate easier access to oral health care for those presently with no insurance coverage. In addition, a governmental specific health fund is suggested to be raised through taxation (health tax), paid by industrial companies according to the harm their products are causing as oral diseases. The state could then afford the premium in the public insurance scheme for all or at least for those of low income in Iran.

There is a need for a new orientation of the oral health care policy towards putting more emphasis on preventive care. That should include obligatory regular dental check-ups and the maximum coverage and inclusion of all preventive services in the insurance programs. In addition, allocating part of insurance companies’ revenue to community-based interventions such as water fluoridation as a strategy for oral health promotion is recommended.
9. SUMMARY

Utilization of professional oral health care should be considered in organizing good oral health for the population. Use of oral health care services is affected by many factors: personal, cultural, and institutional factors. They depend on individual characteristics of the care providers, and the availability, accessibility, affordability, and acceptability of the care delivery system. The patient’s perception of subjective need, demand, and the characteristics of the care delivery system determine the utilization of oral health care services.

The financing system of oral health care services influences the demand, amount and the type of services. The cost of care is often the barrier to seeking care. Several studies in developed countries have shown that dental insurance or third party payment increases demand and utilization of care services. Many countries have publicly financed care systems for children and adolescents. In some countries public or private insurance serves to partly cover the cost of care.

In Iran the government is trying to improve people’s social security by different methods including also insurance schemes. The two types of dental insurances in Iran are public and commercial. The public sector is obliged to provide its employees with public insurance, and a partial premium is deducted from the employee’s wages. In commercial insurance, the employer pays the premium in total for the employees and their families as a fringe benefit. Dentists employed by public insurance get a monthly salary, and the contracted dentists are paid on a fee-for-service basis.

The present study was designed to determine the relationship between insurance status, utilization of services, and characteristics of the oral health care among adults in Tehran, Iran. Factors related to the selection of a dentist among insured patients were also identified. The study was based on cross-sectional data obtained through phone interviews. A total of 1531 subjects answered, but 224 were under 18 years of age and therefore excluded, and 221 refused to respond, resulting in a final sample of 1086 people. The interview was carried out with a structured questionnaire of fixed and open-ended questions. The interview covered demographic and socio-economic background, characteristics of dental visits, and the reason for selecting a particular clinic.

Most participants reported having dental insurance, and the majority had public insurance. Insurance was most common among women, older age groups and those with a higher level of education. Insurance elevated the demand for care, and the highest demand was among persons with commercial insurance. Insured persons had a higher frequency of dental visits than did the non-insured. Type of services, however, did not differ between the insured and non-insured, except for extractions, which were more common among the non-insured.

Good interpersonal relations and assumed higher quality of services were the most important factors when an insured person made the selection of a particular dentist or clinic. A surprisingly high proportion of those covered by insurance were unaware of their benefits—especially among people with public insurance.

The present findings indicate a clear need to modify dental insurance systems in Iran to facilitate optimal use of oral health care services to maximize the oral health of the population. Special attention in insurance schemes should be focused on preventive care.
10. ACKNOWLEDGMENTS

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My dearest thanks to my wife Farnaz, for her patience and love, and to Ehsan and Dorna who tolerated the months without me. My heartfelt thanks also go to my father and my mother-in-law for their everlasting support and encouragement.

This thesis I dedicate to all who suffer from their disease and cannot afford the cost of their treatment.

Fariborz Bayat
Helsinki
May 2010
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12. APPENDIX

Questions in the interview (translation)

The original questions in Persian can be provided upon request.
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Impact of dental insurance on adults’ oral health care in Tehran, Iran.

Department of Oral Public Health
Institute of Dentistry
University of Helsinki
Finland

Department of Community Oral Health
School of Dentistry
Shahid Beheshti Medical University
Iran
1. Sheet number ………………
2. Interviewer code………………
3. Interview date (dd/mm/yy)
4. Date of birth (dd/yy/mm)
5. Phone number …………………

6. Do you have any health insurance coverage?
   [ ] Yes  [ ] No

7. What kind of insurance do you have? (for those who have insurance coverage)
   [ ] Public insurance  [ ] Commercial insurance

8. Do you know what type of dental services are covered by your insurance?
   [ ] I know my insurance covers dental services and I am completely aware of type of services provided by my insurance
   [ ] I know my insurance covers dental services and I am somewhat but not precisely aware of type of services provided by my insurance
   [ ] I know my insurance covers dental services, but I do not know what type of services are provided.
   [ ] I do not know whether or not my insurance covers dental services.
   [ ] I know my insurance does not cover dental services.

9. When was your most recent dental visit?
   [ ] Within the past 6 months  [ ] 7 to 12 months ago
   [ ] Over one year up to 2 years  [ ] Over two years up to 5 years
   [ ] More than 5 years ago  [ ] Don’t remember
   [ ] Never visited a dentist

10. If you have made dental visits in the past 12 months, how many visits in total have you made?
   [ ] One visit  [ ] Two visits
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. What was the reason for your most recent dental visit?</td>
<td>Check-up, Trouble with teeth or gums, Continuing dental treatment, Never visited a dentist</td>
</tr>
<tr>
<td>12. What dental treatments did you receive during your most recent visit?</td>
<td>Examination, Prescription, Radiography, Scaling, Fissure sealant, Fluoride therapy, Amalgam filling, Composite filling, Extraction, Surgical procedure, Orthodontics, Endodontics, Crown or bridge</td>
</tr>
<tr>
<td>13. Where was your most recent dental visit?</td>
<td>Insurance-owned dental clinic, Public dental clinic, University dental clinic, Private office/clinic contracted with insurance, Private office/clinic without contract</td>
</tr>
<tr>
<td>14. What were your reasons for selecting that clinic during the most recent dental visit?</td>
<td>Convenient office hours, Convenient location, I know only this clinic, Short waiting time, High quality of services, Use of up-to-date equipment and materials, Good infection control, The dentist’s high-quality skills</td>
</tr>
</tbody>
</table>
Modern clinic
Friendly personnel
Reasonable fees
Recommendation by a friend
Friendly dentist
Free-of-charge services
Being a contracted clinic
No reason

15. What were your reasons for not selecting an insurance-owned or insurance-contracted clinic during the most recent dental visit? (Only for those insured people who selected private clinics)

☐ My present insurance plan doesn’t cover my recent dental treatment needs.
☐ Low quality of service
☐ I have known the dentist for a long time
☐ Insurance-owned or contracted clinics were crowded
☐ Insurance-owned or contracted clinics were far from my home/office

16. How much is your monthly household income?

17. What is your highest level of education?

☐ No schooling (illiterate) ☐ Primary or secondary school
☐ High school or diploma ☐ Associate degree
☐ Bachelor’s degree ☐ Masters degree

18. Interviewee: Surname: …………………First name:…………

19. Gender:

☐ Male
☐ Female

20. Time used: ………………..
در این مطالعه رابطه و ضعیت بیمه درمانی با تقاضا جهت دریافت خدمات مراقبت سلامت دهان و همچنین عوامل متصل به انتخاب دندانپزشک و یا مرکز دندانپزشکی جهت دریافت خدمات در افراد بیمه شده مورد بررسی قرار می‌گردد.

داه‌های این مطالعه بطور مقطعی "cross-sectional" از طریق مصاحبه تلفنی جمع‌آوری شده و جمعیت مورد مطالعه شامل افراد بیمه‌ای (مراجعه‌کننده در سال 1384) در تهران و با روش تصادفی، سطح بالای 3200 نفر جمع‌آوری شد. مصاحبه‌های تلفنی نیز از 18 ماه قبل از مصاحبه برای مشاوره و ارتباط با آنها شدند.

۴۶٪ از مردان، ۵۷٪ زیر ۴۰ سال، ۶۲٪ زن و ۵۷٪ بیمه‌ای بودند. در مصاحبه‌ها، مراجعه باید داشته باشد و کل هزینه را می‌پرداختند. افراد بیمه‌ای بیشتر از دوباره، دندانپزشک را در آخرین مراجعه به دندانپزشک مراجعه داشتند.

رابطه بیمار با دندانپزشک و عدم آگاهی از پوشش خدمات دندانپزشک، از جمله مواردی است که در انتخاب مرکز یا دندانپزشک ارائه‌کننده خدماتی از دویند. گزارش‌های این مطالعه نیاز به اصلاح در بخش سلامت بهتر است به اهمیت لحاظ نمودن مراقبت‌های پیشگیری در بستر خدماتی بیمه توجه بیشتری نماید.