A COMPARATIVE STUDY OF DENTAL HEALTH NEEDS, DEMAND FOR, AND ATTITUDES TOWARD DENTAL CARE IN TWO GROUPS

A Thesis

Presented To

The Faculty of Graduate Studies and Research

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In partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

William Theophilus De Haney

April 1967

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ABSTRACT

The study was primarily concerned with the investigation of (a) the extent and nature of dental health needs among two selected groups of persons receiving dental care from different sources (b) the relationship between the socio-economic factors of age, sex, level of income, level of education and attitudes toward dental care and (c) the relationship between the foregoing socio-economic factors and the demand for dental care. A minor objective of the study was to estimate the differential between the supply of dentists' services in Metropolitan Winnipeg and the potential demand for those services.

One of the two groups included in the study was chosen from the clinic population of the Dental School at the University of Manitoba. Following the review of a random sample of 149 dental records, the names of 100 patients were randomly selected and stratified by age and sex. A second stratified random sample of 185 non-clinic patients was chosen from three public high schools in the Winnipeg School System. The sample of patients from the Dental School Clinic served as an 'experimental' group and the non-clinic sample served as a 'control group'. Both samples represented 10 per cent and 5 per cent of the respective populations from which they were drawn.

Data on the dental needs of the clinic patients

were collected from the individual dental records and transferred onto a single work sheet. Thereafter dental needs were categorised into seven classes: caries, periodontal diseases, malocclusion, endodontic need, prosthodontic need, the need for oral surgery and the need for crowns and bridges. Following this classification, the patients were distributed by age and sex, according to the type of dental treatment needed.

Attitudes toward, and demand for, dental care were studied by means of an interview schedule which was administered to the subjects in the two sample populations. The schedule was sub-divided into three sections: (i) Section A, was concerned with social stratification data - age, sex, level of income, education and occupation; (ii) Section B was concerned with the respondents past dental history; and (iii), Section C consisted of attitude statements and questions arranged into agree-disagree or other forced choice categories in a Likert-type attitude scale. The final interview schedule consisted of fifty-six questions and statements.

To arrive at the final interview schedule eighty-five questions and statements were collected from dental journals and other sources and arranged into a draft questionnaire. The draft was submitted to four persons who had had considerable experience in constructing social research questionnaires. After the comments of these persons had been received and adjustments made to the draft, it was pre-tested on a group of 102 persons at the Dental School Clinic during September

1966. As a result of the pre-test further adjustments were made to the schedule of questions. The items included in the final attitude scale were selected after an index of the discriminatory power of each item had been computed. The upper and lower 20 per cent of the scores were selected and the respondent's total score on the individual items computed, as well as the mean score of each of the two groups on the individual items. Those items which had produced a mean difference of .65 or more between the scores of the upper and lower groups were selected for the attitude scale. During the period October 1966 to January 1967 the investigator interviewed the subjects included in the sample populations.

IBM data processing techniques were utilized in sorting and tabulating the data collected on the interview schedules; but all the statistical operations were carried out by the investigator on a desk calculator. By means of contingency tables and the Chi-square test, the association between the various dimensions of socio-economic status (age, sex, income, education), and attitudes toward, and demand for, dental care was analysed. The .05 level of confidence was chosen for the determination of significance, and since the direction of association between the variables had been predicted, the region of rejection had to be one-tailed.

With regard to Part II of the study - the differential demand for, and supply of, dentists' services - a random

sample of 76 dentists practising in Metropolitan Winnipeg were studied by means of mailed questionnaires. Supply of dentists' services was studied in terms of the mean number of patients and patient-visits accommodated by each of the dentists in the sample during 1965. On the basis of the estimated patient-visits per dentist, the supply of dentists needed to meet the potential demand for dental care in terms of the population aged 4 years and older was estimated and the difference between the known and the estimated supply of dentists calculated.

Analysis of the dental needs of the clinic patients showed that the three most prevalent dental problems were caries, periodontal disease, and the need of correction for malocclusion. None of these problems was found to be significantly associated with sex, although the data showed that a slightly higher percentage of females than males needed treatment in respect of the first two problems specified.

Attitudes toward dental care were found to be significantly associated with source of dental care, and non-clinic patients more than clinic patients indicated a favourable predisposition to seek regular periodic dental care. No significant association was established between age and attitudes toward dental care, but "age at first visit to a dentist" was found to be significantly related to attitudes toward dental care: a person who had made his first visit to a dentist before the age of 14 years was more likely to view regular periodic visits as a necessity than one who had done so after that age. In the non-clinic group, sex, education, and level of income were found to be

significantly related to attitudes toward dental care; but in the clinic group only education showed similar results.

Demand for dental care (measured by time elapsing since last visit to a dentist, and frequency of visits to a dentist) was found to be significantly related to source of dental care. A greater proportion of the Clinic patients than non-clinic patients reported that they had visited the dentist "less than 11 months previously"; but in terms of the more reliable measure of demand for dental care - frequency of visits - a greater proportion of the non-clinic patients than the Clinic patients habitually visited a dentist at regular intervals of less than one year. Clinic patients more than non-clinic patients were likely to visit a dentist "only when something is wrong with their teeth". In both groups, level of income was found to be significantly associated with the demand for dental care; on the other hand, sex and frequency of visits were related in the non-clinic group, but not in the clinic group.

On the basis of the data collected and the estimates derived therefrom, the supply of dentists available in Metropolitan Winnipeg during 1965 was inadequate to meet the potential demand for dental care at that time: approximately 260 dentists would have been needed in order for each person 4 years old and over to receive two appointments during the year. The number of dentists listed in the classified section of the telephone directory was 203.

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS

BACKGROUND TO THE PROBLEM

Introduction

Comprehensive statistics on the extent and nature of dental health needs at the national level are hard to come by, partly because the cost of collecting such statistics would be extremely high, and also, because dental needs change from time to time. For Canada, the available data which come closest to an over-all population coverage have been derived from the 1950 to 1951 study -- Illness and Health Care -- conducted by the Dominion Bureau of Statistics. While a number of other studies have been done since this period, focussing on different aspects of dental services, none comparable to the 1950-51 study has been carried out ascertaining the prevalence patterns of dental diseases and disorders from the standpoint of clinical diagnosis or from the standpoint of the general public in terms of perceived need.

The data concerning demand for dental treatment, or rather, estimates of that demand seem to be more up-to-date than estimates of need. This is especially true in the case of the dental statistics available on children's diseases. Most of the periodicals produced by the dental

profession include one or more reports of studies involving the age ranges 18 months to 16 years in some areas, and 2 years to 12 years in others.

Although the data on dental and oral health needs are far from being comprehensive the various partial studies indicate that there is a wide range of disorders, both among adults and children. The reasons for this prevalence have been attributed, in different quarters, to different causes. In some quarters the problem is said to be simply one of insufficient demand: that is, some sections of the public do not seek dental treatment because they cannot afford to pay for it; others blame the prevalence of dental ill-health on the inadequate supply of dentists' services.

From the social scientist's understanding of the matrix of social and psychological factors motivating human behaviour, be it health behaviour or any other kind of behaviour, he would argue that attitudes of the general public toward health as a whole would influence their use of dentists' services. While there is some evidence, as will be shown in a review of the literature to follow, that the economic factor cannot be ignored in accounting for the variation in patterns of utilization of dentists' services, there is evidence too, that "different sections of the population are likely to regard dental health as having different importance and accept varying degrees of dental

fitness as meeting their needs.[1]

The Problem

The general scope of the present study covers an investigation of the extent and nature of dental health needs among two selected groups; the socioeconomic factors which affect the utilisation of available dental services; and the relationship between attitudes and the demand for professional dental services. Since demand and supply are usually related the study also attempts to estimate the availability of dentists' services.

More specifically, the study had the following four objectives:-

1. To measure the extent and nature of dental health needs in certain specific situations by comparing dental needs -- perceived and clinical -- of a sample of dental patients from a university dental school clinic with a non-clinic sample.

2. To measure the relationship between dental health attitudes and demand for professional dental care.

3. To measure the demand for dental care by age, sex, level of education, and income level or the ability to pay for dentists' services; and

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[1]Morpurgo, P. W. R., "A Sociological View of Dental Health," British Dental Journal: Section on Odontology, Vol. 56, No. 10, April 1963, pp. 350.

4. To estimate the supply of dentists' services and measure the differential between demand and supply of dentists' services.

Definition of Terms Used

Attitude:- There are conceptual differences among social scientists in the definition of attitude; but for this study the concept will denote the individual tendency to react positively or negatively to a given social value or object. A positive or negative attitude toward dental care means, therefore, the tendency of an individual to seek or not to seek regular periodic dental checkups.

Beliefs:- Attitudes depend upon beliefs, but beliefs refer to the acceptance of practices, statements or propositions as true or desirable.

Culture:- Wherever the concept is used in this study it shall be interpreted as meaning that complex of socially transmitted traits of which beliefs, attitudes and modes of behaviour are a part.

Dental Need:- Need here refers to the entire range of oral disorders which has been clinically diagnosed, or would be diagnosed, as requiring professional treatment. It includes such disorders as caries, periodontal diseases, occlusal defects, oral cancer, and congenital abnormalities.

Perception of Need:- Clinically diagnosed pathologies are not always recognized by those persons affected by them. Perceived dental needs therefore refer to those

dental disorders which have been recognized as requiring treatment, whether or not the condition has been clinically diagnosed.

Social Behaviour:- Social behaviour refers to the behaviour of human beings that occurs in response to the presence or activity of other people. Even when the behaviour of an individual takes place away from other people, it will still be thought of as social provided it takes into consideration the expectations and norms of his group.

Social Values:- These are either tangible objects, like money, or a pattern of behaviour toward which the members of a group strive. Dental health as a social value will lead those with the value to strive to maintain optimum dental health.

Demand for Dental Care:- Demand for dental care means the frequency with which people visit the dentist on a voluntary basis.

Health Behaviour:- This concept covers those procedures used by laymen and specialists to promote health, prevent illness, and remedy sickness. With reference to dental health it means those procedures used by laymen and specialists to prevent dental disorders and correct those already present.

CHAPTER II

REVIEW OF THE RELEVANT LITERATURE

Dental Health Needs

There is general agreement everywhere among dental authorities that the need for dental care is a universal health problem. This means that everyone at one time or another in his life, either seeks or needs to seek some form of dental treatment. By professional standards the concept of dental care covers the total diagnostic, preventive treatment, and restorative services rendered by a licensed dentist or auxiliary personnel under the direction of a dentist.[2] But from the evidence available from partial surveys of dental and oral health this is a much neglected aspect of general health.

Tooth Decay:- It has been estimated that, with the possible exception of the common cold, tooth decay affects more people than any other disease.[3] One study reports that almost 100 per cent of Canadians experience one form or another of dental disorder by the time they have reached

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[2] American Medical Association, Council and Medical Service, Volume Prepayment Medical Benefit Plans: Chicago, American Medical Association, 1961, pp. 24.

[3] Dental Health Manual, Information Services Division, Department of National Health and Welfare, Canada (Reg. No. 30-P-3140), pp. V, 1962.

the age of 15 years. By the age of 16 years the most common and chronic of oral diseases, tooth decay, attacks 95 per cent of the population resulting in the loss of two teeth and reduced chewing ability.[4] The magnitude of this problem is similar in the United States, where it has been reported that three out of every four persons have an oral disorder of some type, with tooth decay affecting between 95 and 98 per cent of the population.[5]

Periodontal Disease: - Like tooth decay, periodontal disease has been found to be prevalent as a dental health problem. It has been described as "one of the most widespread diseases of mankind. No nation and no area of the world is free from it, and in most it has a high prevalence, affecting in some degree approximately half the child population and almost the entire adult population."[6] The disease attacks the supporting structures of the teeth, and causes the loss of as many teeth as does tooth decay.

A study of dental health involving school children

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[4]Ministries of National Defence, National Health and Welfare and Veterans Affairs. General Public Health Grant -- Dental Health: Medical Services Journal 20: 441, 1964.

[5]American Medical Association: Today's Health, Vol. 39, No. 10, 1963, pp. 80-81.

[6]World Health Organisation. Expert Committee on Dental Health. Periodontal Disease. World Health Organisation Technical Report Series No. 207, 1961.

of six Canadian provinces found that 16 per cent of the population showed objective signs of gingival inflamation,[7] while another study involving 670 adults found that 90 per cent of both males and females were suffering from Simplex Periodontitis and that over 16 per cent of the men and 10 per cent of the women showed evidence of Complex Periodontitis.[8] These findings are supported by a similar study of 381 employees of the Ontario Department of Highways. The latter study found that a majority (68 per cent) of the employees had gingivitis or incipient periodontitis.[9]

Malocclusion:- This disease not only results in irregular arrangement of one's teeth but it also leads to disfigurement of the facial structures. Broadly speaking, it may be described as a deviation from the normal occlusion of the teeth, or from the normal relation of the jaws. People suffering from this disease are usually handicapped in several respects: chewing ability becomes impaired, and so is speech. The psychological effect, too, is said to be equally great, for severe malocclusion may make people so

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[7] Canadian Dental Association, brief submitted to the Royal Commission on Health Services, Ottawa, March 1962, pp. II-2

[8] Mehta, M. M., Grainger, R. M., and Williams, C. H. M., "Periodontal Disease Among Adults", Journal of Canadian Dental Association 21: 617, 1955.

[9] Freedman, M. L., Williams, C. H. M., and Grainger, R. M., "Prevalence and Severity of Periodontal Disease in Adults," Journal of Canadian Dental Association 31: 784, 1965.

conscious of the physical difference between themselves and other people that they may become emotionally disturbed and fail to participate in social activities necessary for their general well-being.[10]

The magnitude of this problem as it affects Canada is reported from findings of the 1961 National Health Survey already cited. It has been estimated here that almost 50 per cent (48.9%) of the children covered by that survey had "one or more types of occlusal abnormality." Yet, less than 1 per cent of them were receiving treatment for occlusal correction. For the population as a whole, the report states that it is rare to find persons with completely ideal occlusion, and estimated that between 50 and 75 per cent of the population could benefit from some amount of orthodontic treatment.[11]

For most countries, from which information is available about dental health needs, the pattern is somewhat similar to those of Canada. In his comment on a study carried out in the United States, Professor McGregor has stated that of 119,000 school children studied in St. Louis it was found that 51 per cent of them had dento-facial

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[10] MacGregor, C. Frances, "Some Psychological Problems Associated with Facial Deformities," American Sociological Review, 16, 1951: pp. 629-638.

[11] Canadian Dental Association, op. cit., Appendix I, p. 6.

abnormalities.[12] Dr. Young, also, in commenting on the dental health of children in the United States stated, among other things, that of the 10 per cent of children under five years of age who visited the dentist, one child out of five needs orthodontic treatment for afflictions ranging from faulty alignment of the teeth to severe facial deformity. He stated, too, that estimates of the occurrence in children of malocclusion are serious enough to warrant treatment ranging from 20 to 80 per cent. One out of five children, according to this report, had an orthodontic problem that could be considered severe.[13]

Similar results were obtained by the present writer from the current study. In a group of children between 6 and 19 years old who attend the University of Manitoba Dental School Clinic one out of six children needed orthodontic treatment, and nearly 25 per cent of the adults between 20 and 65 years old have some form of occlusal defect needing treatment.[14]

Other Dental Health Needs:- One oral disorder

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[12] McGregor, S. A., "Without Prejudice", Canadian Doctor, June 1962, p. 2.

[13] Young, Wesley O., "Dental Health," Survey of Dentistry, Washington, D. C., American Council on Education (ed.) Hollingshead, Byron, 1961, pp. 5-6.

[14] Dental Health Needs, Table 2, p. 61.

which is of concern to both the dental and medical professions is oral cancer. It has been estimated that nearly 10 per cent of all the cancer found among Canadians originates in the mouth. And the problem is much the same for the United States, where 10 per cent of all the cancer discovered among the male population arise in the mouth and adjacent areas. While the disease accounts for 2 per cent of all the cancer discovered among females,[15] there are nearly 5,000 deaths from oral cancer, that is, about 1 out of every 40 cancer deaths.[16]

There is, too, a category of dental defects which are congenital in origin. These may be listed as unerupted teeth, cleft palate and harelip. For the United States, as well as Canada, congenital dental disorders are widespread. One United States report states that cleft lips and palatial deformities may be found among 1.3 per 1,000 of the live births for that country.[17] In Canada, the rate is said to be 1 in 760 births,[18] with missing teeth, supernumerary

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[15]Dorn, H. F., "Illness from Cancer in the United States," Public Health Report, Vol. 59, January 1944, pp. 65-77.

[16]Predictability of Dental Care Needs of Adults," Journal of the American Dental Association, L II, June 1956, pp. 708.

[17]Grace, L. G., "Frequency of Occurrence of Cleft Palates and Harelips," Journal of Dental Research, Vol. 22, 1943, pp. 495-497.

[18]Medical Services Journal, op. cit., also Castaldi, C. R., Bodnarchuk, McRae, P. D., and Zacherl, W. A., Journal of Canadian Dental Association, Vol. 32, 1966, pp. 154-159.

teeth and fused teeth being the main anomolies among young children.

But although the range of dental health needs has been generally recognized by dental authorities everywhere, three broad categories have been most emphasized. In describing the situation as it affects the United Kingdom one study reported that dental caries and periodontal diseases resulted in a great deal of pain and economic loss, and added that, with respect to the third major category of dental disorders, malocclusion, the population at risk is everyone in the country.[19] Similarly, a nation-wide survey in the United States reported that the main causes of loss of teeth among the American people were dental decay and periodontal diseases. "During his lifetime," the report states, "nearly every person has one or both of these ailments."[20] While there is no comprehensive set of statistics on dental health in Canada, the various partial studies reflect similar needs for the population as a whole.

Demand, Utilisation, Supply of Dental Services

Definition of Demand:- The demand for any commodity or service, in economic terms, may be defined as the

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[19]Moser, C. A., Gales, Kathleen, Morpugo, P.W.R., Dental Health and Dental Services: An Assessment of Available Data, Nuffield Provincial Hospitals Trust, London: Oxford University Press, 1962, p. 3.

[20]U. S. Department of Health, Education and Welfare, Health Statistics, Series B-No. 22, U. S. National Health Report, p. 1.

recognized and expressed need supported by the ability and willingness to pay for that service or commodity. Operationally, effective demand for a given service or commodity is the amount of it purchased at a given price over a given period of time.

When demand is so defined, it should not be surprising that the differential between need and demand for dentists' services is great. For what the dental authorities recognize as a situation needing professional attention may have little or no significance for the patient and the public. Furthermore, since the utilisation of dental services, in countries where these services are not state-supported, is related to the consumers' ability to pay on a fee-for-service basis, demand will depend upon the purchasing power of the different publics, as well as on their awareness of a disorder needing professional attention. Of course, the relative importance or value which people place on dental care will affect the amount of care demanded, as will their perception of the need, their ability to pay and the availability of the service.

However, there appears to be widespread agreement among those responsible for dental health that the persistence of dental diseases cannot be explained away in terms of inadequate public demand. Sperber in commenting on the Canadian situation states that "dental disease is a public health problem of unrealized magnitude, for the dental

treatment rendered to the Canadian people does not really meet the real dental needs of the population.[21] Likewise, the National Dental Health Survey of 1958, in accounting for the nationwide magnitude of the problem cites the shortage of dentists as an "obviously important factor in the low utilization of dentists' services in rural and in certain regions of the country."[22]

Patterns of Utilisation:- Many factors have been said to affect the demand for and utilization patterns of dental services. Some of those most frequently mentioned are age and sex, levels of education and income, social class values, as well as those psychological factors which may be grouped under the heading of attitudes.

In the United States one study found that less than 50 per cent of the population visit a dentist at least once a year, and of those who did so there were twice as many females as there were males.[23] Canadian estimates of the rates of utilisation of dentists' services differ as to

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[21] Sperber, G. H. "Interrelationship of Oral and General Health," Journal of Canadian Dental Association, Vol. 31, No. 11, Nov. 1965, pp. 730-731.

[22] Royal Commission on Health Services, op. cit., p. 12.

[23] Anderson, Odin W., and Feldman, J. J., Family Medical Costs and Voluntary Health Insurance, A Nationwide Survey, 1956, p. 180.

the proportion of the population receiving dental care. The Canadian Sickness Survey of 1950-1951 reports that "about 1 in every 7 persons visited the dentist during 1950-51,[24] and another report states that "in any given year only about one-third of the population visits a dentist."[25]

As already mentioned, the patterns of utilisation vary with age and sex. Friedson states that "as age increases, the proportion of people actually seeing a dentist decreases." He found that although 48 per cent of those between 21 and 34 years old who regularly visited the dentist did so once a year, only 16 per cent of those persons 65 years old and over did so.[26] The Canadian Sickness Survey reports a similar pattern in the demand for dental care among Canadians. Both men and women in the 15 to 24 age group had the highest proportion of any age group visiting the dentist, and as age increased, the proportions of both men and women visiting the dentist dropped.[27] Some writers, commenting on the greater

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[24]The Department of National Health and Welfare and the Dominion Bureau of Statistics, Illness and Health Care in Canada: Canada Sickness Survey, 1950-51, Ottawa, Queen's Printer, 1960, p. 54.

[25]Canadian Dental Association, op. cit., p. 9.

[26]Friedson, Eliot, and Feldman, Jacob J., "The Public Looks at Dental Care, "Journal of the American Dental Association, Vol. 57, No. 3, September 1958, p. 329.

[27]Canadian Sickness Survey, op. cit., pp. 189-190.

demand for dental care among women than among men have attributed this to the high social value which our society places on feminine physical attractiveness, of which the teeth are an important part.[28]

Most of the studies concerned with the demand for and utilization of dental services have stressed that the cost of dental services, and therefore the income level of the consumers is the crucial factor determining demand for, and use of these services. According to the 1950-51 Canadian Sickness Survey report "the average number of dental visits increased consistently from one income group to the other. The average number of dental visits per 1,000 population for the upper high income group was more than three times as great as the comparable average for the low income group."[29] Similar patterns have been found in a number of studies undertaken outside of Canada.

One of these shows that as family income increases from below 2,000 dollars a year to over 7,000 dollars a year, so does the percentage of families seeking preventive dental care increase.[30] Another survey reported that the proportion

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[28]McFarlane, Bruce A., Dental Manpower in Canada, Royal Commission on Health Services, 1962, p. 81.

[29]The Canadian Sickness Survey, op. cit., p. 55.

[30]Kriesberg, L., and Trieman, B. R., "Socio-Economic Status and the Utilisation of Dentists' Services", Journal of the American College of Dentists, Vol. 27, September 1960, pp. 148 and 150.

of people who had never been to a dentist during 1958 was greatest (24 per cent) among persons with family incomes under $2,000 and least, (10 per cent) for persons in the "$7,000 and over" family income groups.[31]

As in the case of age, sex, and income, education has been found to be positively related to the utilization of dental services. The United States Health Survey, already referred to, states that when persons were classified according to the educational attainment of the family-head, the demand pattern was similar to that exhibited for family income. Of the persons visiting the dentist during the year prior to that Survey, the lowest per cent was found within the educational group with less than 5 years of school, while the highest per cent, 57, was found within the groups with heads of families who had completed at least one year of college education.[32] A subsequent United States survey has supported the above findings. It shows, in addition, that whereas the percentage of people not going to the dentist when dental work is needed is 53 per cent at the grade school level, in the same income group and with a college education the percentage decreases to 10 per cent.[33]

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[31]U. S. Health Survey, op. cit., p. 4.

[32]Health Statistics, Series B, No. 14, Ibid., pp. 5-6.

[33]Kriesberg, L. and Treiman, B., op. cit., p. 150, Table 2.

There are no comparable data available for Canada, with respect to educational level and demand, but it has been said that the situation here is similar to that of the United States. McFarlane, for example, feels that there is little reason to believe that the Canadian pattern of visiting the dentist by educational background is more favourable than that in the United States. In fact, he argues that if the demand for dental care in Canada is consistent with other social patterns it is likely that the proportions by educational background, visiting the dentist in any one year in Canada, are lower than the proportions doing so in the United States.[34]

That the demand for, and utilisation of dentists' services vary positively with the level of family income and ability to pay for those services needs qualification. Evidence from the United Kingdom and New Zealand, where medical and dental services are state supported, shows that the rates of utilisation within those countries are no higher than in Canada where dental care is paid for on a fee-for-service basis.[35]

Contrary to popular opinion that the ability to pay for health services is a prime determinant of a demand for

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[34]McFarlane, Bruce A., op. cit., p. 86.

[35]Schachter, Joseph J., "The Dental Health of New Zealand Children, Adolescents and Young Adults", New Zealand School Dental Practice: Reports of Saskatchewan Department of Public Health, 1962, p. 5.

them, studies have shown that many other factors need to be considered. One study aimed at examining the relative importance families place on their health, and the effect this had on the demand for medical and dental services, found that the ability to pay was not a crucial factor in the demand for dental services. The results of the study indicated that "the prevention of dental caries has little meaning to those who do not accept the debilitating effects of this affliction."[36]

Jaco reported that while lower income families were found to spend slightly less for health services than those with higher incomes (some $10 less for medical care and roughly $50 less for dental care) unmet medical needs among the lower income families "could frequently be traced back to fear of treatment rather than amount of income." While dental check-ups were found to be somewhat more common in the higher income group, medical check-ups were somewhat more frequent in the lower income group. However, in both groups children were much more likely than adults to receive complete medical and dental care.[37] According to the findings of Jaco's study, what seems to be an important factor influencing the public's decision to seek regular dental

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[36]Jaco, Gartly E., (ed.), Patients, Physicians, and Illness, p. 159.

[37]Jaco, Gartly, E., Ibid., pp. 158-160.

care, and health care in general, is the relative importance which is placed on health in relation to other goods and services.

It is obvious that for countries like Canada where there is no national programme taking care of medical and dental needs, such as exists in the United Kingdom and New Zealand, there is an income level below which a particular family cannot afford to take care of its own health needs. But even when this economic barrier is removed the pattern of neglect remains. In 1959, for example, the California State Department of Public Health sponsored a project which aimed at discovering, among other things, the extent to which medical and dental services provided by the Aid to Needy Children (ANC) programme in Santa Clara County were being utilized. The findings show that just over one-third of the children had visited a physician in the year prior to the survey. Three-quarters of thoseunder study had not visited a dentist.[38] It is perhaps significant, too, that approximately one-half of the medical and dental contacts were made with private physicians and dentists although there were a number of other sources available to them, such as hospitals and public health clinics.

Some of the other studies on dental care seek to

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[38]Corsa, Jr., Leslie, "Challenges in California's Public Health Medical Care for Children", in American Journal of Public Health, Vol. 51, No. 10, October 1961, pp. 1509-1513.

explain the variation in patterns of demand and utilization in a set of factors which are neither exclusively social nor economic; but which, in combination with other social elements form a system of values. The overt patterns of health behaviour are held generally to reflect both individual and social attitudes. Both attitudes and overt behaviour are said to reflect the social class values of the community or group of which the individual is a member.

Attitudes Toward Dental Care

Not very much is known about attitudes toward dental care, since very few studies have made them a major focus of research. A few studies, however, have provided some information from which it is possible to infer the beliefs and values surrounding dental health.

The Koo's study provides several striking illustrations of what some people think about their teeth. For example, one housewife is quoted as saying: "I'll come right out and say that my bad teeth are going to pieces. I had to put clove (oil) on one this morning. But I'm not going to spend a lot of money for a dentist every little while."[39] This is the remark of a Class II (middle class) housewife, but the same general attitude toward the importance

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[39]Koos, Earl Lomon, The Health of Regionville : What People Thought and Did About It. New York: Columbia University Press, 1954, p. 125.

of professional dental care is present among members of other social classes. Thus, a Class III (Lower Class) housewife stated that "we go to the dentist if there is anything wrong, like having a tooth pulled. But we don't go regular. There's just too many other things that has to come first....You've got to go to the doctor sometimes, vut the dentist -- you can get along without him much better."[40]

From these illustrations it seems reasonable to infer that a prime factor in dental neglect is the feeling that dental disease is not a serious enough ailment to warrant the expenses that regular professional care would necessitate. Not only this, but the importance of dental care relative to other goods and services seem to be placed on a lower level by some members of the public. When the respondents of another study were asked about the seriousness of dental problems most of them could not recall any such problem which had been serious enough to interfere with important aspects of their lives.[41]

Other studies concerned with the reasons surrounding the neglect of medical and dental problems view this in terms of the individual's perception of his dental condition.[42]

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[40]Koos, Earl Lomon, Ibid., p. 118.

[41]Kegeles, Stephen S., "Factors Relevant to People's Seeking Dental Care, "American Journal of Public Health, Vol. 51, No. 9, September 1961, p. 1308.

[42]Kriesberg, Louis, and Treiman, Beatrice R., Public Attitudes Toward Prepaid Dental Care Plans. National Opinion Research Center: University of Chicago, Illinois, 1960, pp. 91-102.

Stoeckle and his colleagues argue that preventive health care will not be sought by people who have no clear idea of their disorder. For these persons, treatment will be sought only after the disorder has reached a critical stage; that is, when the disorder begins to affect adversely their jobs and social lives. The writer further points out that health behaviour is influenced by the general rationale which people have about health and illness: those who place a high value on "achievement" in work or in some other sphere may equate health and achievement, and see illness as a threat to their ability to achieve.[43] When this is the case people have a reason for seeking to cure their maladies.

The apparent negative attitudes which some sections of the public have toward dental and health care in general are said, however, to be related to a combination of institutional factors within the dental and medical programmes. These factors are said to confuse, frustrate, and create hardships for even those parents who recognise the importance of early and regular health care for themselves and their children. Dr. Baumgartner has noted that the person or family that needs medical care must sometimes go from place to place, or from agency to agency, simply because he is lost

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[43]Stoeckle, John D., Zola, Irving A., and Davidson, "On Going to See the Doctor, The Contributions of the Patient to the Decision to Seek Medical Aid," Journal of Chronic Diseases Vol. 16, 1963, pp. 975-989.

in a maze of red tape created by the very people trying to help.[44] Wilbur Hoff makes a similar argument against health agencies which fail to reach what he calls the 'submerged third' in our communities. He argues that the organisational structure of health agencies reflect middle-class values which do not appeal to people from the lower-income brackets. Hochbaun is quoted as saying that the submerged third are hard to reach "primarily because we....appeal to values which are ours, but not theirs, and because we would like them to strive for things which are simply not important, or perhaps ....not understandable to them."[45]

But whether we are dealing with the submerged third or the more fortunate segments of the public one factor which seems to be of some importance to medical and dental patients is the amount of time they have to set aside in order to seek treatment for themselves and their children. For the work-oriented individual or group, the time spent moving from place to place or from one dentist to another is valuable time spent away from their busy jobs. "The traditional hours of a child health clinic," Hoff remarked, "may not meet the

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[44]Baumgartner, Leona, "Medical Care of Children in Public Health Programs", in American Journal of Public Health, Vol. 51, No. 10, 1961. p. 1492.

[45]Hoff, Wilbur, "Why Health Programs Don't Reach the Submerged Third in Our Communities", Dental Abstracts, Vol. 11, No. 11, 1966, pp. 719-720.

needs of a mother who works all day."[46] Weeks found the same concern for time among upper income families who stated that they usually put off dental and medical check-ups, not because the check-ups were thought to be unnecessary, but because they could not spare the time.[47]

A few studies have also touched on the role of fear of pain as a factor influencing attitude and behaviour with respect to dental care.[48] There is, however, very little agreement in the findings of these studies. While Freidson and Feldman found that fear of the dentist and the pain he inflicts may deter some people from making regular periodic visits to the dentist,[49] another group of studies found this to be the opposite for children with strong internal desires for orthodontic care.[50] It appears though that the extent to which fear will deter people from seeking professional dental care is related to early childhood experiences with the dentist.

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[46]Hoff, Wilbur, Ibid., p. 720.

[47]Weeks, Ashley W., "Family Spending Patterns and Health Care", American Statistical Association 1958, pp. 27-30.

[48]Saper, B., "Psychological Factors in Dental Disorder", Journal of American Dental Association, Vol. 56, No. 2, 1957, p. 223, also, Barland, L. R., "Psychological Considerations in Facial and Oral Pain", Journal of American Dental Association, Vol. 53, No. 5, 1956, p. 539.

[49]Friedson, Eliot, et. al. op. cit., pp. 325-335.

[50]Galburn, Harry S., and Kegeles, S. Stephen, American Journal of Public Health, Vol. 51, No. 9, 1961, p. 1310.

From this review of some of the literature concerned with the problems of dental health care, it becomes evident that a wide range of socio-economic factors, as well as social-psychological ones need to be considered in any study of demand for, and attitudes toward, dental care. Not only the cost of dental treatment affects the extent to which available services are utilized, but such other factors as the knowledge and perception people have of what constitutes dental illness, the value orientation of the groups involved and the organisational structure of the dental health programmes.

CHAPTER III

THEORETICAL BACKGROUND

No single theory of human behaviour proffered by the various social science disciplines can be defended against all others for its adequacy. At the same time each of them makes at least a token contribution to our understanding of the systemic interdependence of biological, physiological and social-psychological factors which interact together to produce any concrete social act.

The strictly psychological approach seeks to explain behaviour as a function of man's physiological nature which manifests itself in the basic processes of motivation, perception and learning. And many psychologists begin their analyses with one of these orientations. Thus the motivationists see human behaviour as a function of man's needs, that is, behaviour is goal-directed and is aimed at satisfying man's needs. Some psychologists on the other hand, orient their approach from an analysis of perception where man is seen as behaving in accordance with the way he sees the world. There are others, too, who orient their approach from the study of learning: from their point of view, the strategic approach to the understanding of behaviour is not so much "Why A or B behaves in this or that way," but how does it come about that A or B behaves in this manner?" In other words, the learning-oriented psychologists view man's behaviour as

a function of what he has learned.[51]

In so far as the strictly psychological approaches in the explanation of human behaviour help us to understand why people take or do not take action to correct health disorders the present writer takes the view that neither the motivation nor the learning-oriented perspective is a sufficient explanation, nor even the perception-oriented perspective. Rather, the whole psychological frame of reference needs to be unified with the socio-cultural approaches. This view seems to have the support of some psychologists and sociologists, as well as other behavioural scientists. Nevitt Stanford,[52] for example, has recently put forward the thesis that "the kind of theory that is needed for the understanding of human problems is different from that which guides most laboratory research.....". He aruges for what he calls "a more general personality - social theory."[53]

But while many students of human behaviour agree that a holistic or integrated theory of behaviour would provide a more meaningful analytical tool they usually emphasize one or more sets of variables. The sociologist is

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[51]Hartley, Eugene L., "Psychological Determinants of Behaviour," in American Journal of Public Health, Vol. 51, No. 10, October 1961, pp. 1541-1542.

[52]Standord, Nevitt, Self and Society: Social Change and Individual Development. Atherton Press, 1966, pp. 7-10.

[53]Stanford, Ibid., p. 9.

no exception at this practice, and as such he seeks to explain the basis for social behaviour in terms of sociological determinants *per se*. He recognizes, nevertheless, that sociological phenomena are meaningful only in so far as they are seen to interact with the biological, the psychological, the cultural, and the environmental determinants of behaviour.[54]

The strictly sociological approach rests on the view that man is essentially a social creature whose needs are met through his interaction with other human beings. Thus, the action one takes in certain problematic situations will depend, in part, upon the culture which has been transmitted to him by those groups within which he has been socialized or with which he identifies. Such groups as the family, age-peers, sex groups, and stratification groups are generally regarded as the source of an individual's basic attitudes and values. One writer has pointed out that these groups, designated reference groups, serve two distinguishing functions and are therefore of two varieties: "The first of these is that of setting and enforcing standards for the person.....The second of these functions is that serving as, or being a standard or comparison point against which the person can evaluate himself and others."[55] In the first

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[54]Strauss, Robert, "Sociological Determinants of Health Beliefs and Behaviour," *American Journal of Public Health*, op. cit. 1548.

[55]Kelley, H. H., "Two Functions of Reference Groups," *Readings in Social Psychology* (ed.), G. E. Swanson et. al. New York: Henry Holt, revised edition, 1952, pp. 410-414.

case the actor is a member of a specific group, while in the second he aspires to membership in some group.

With regard to health behaviour and the influence which reference groups have in this respect, the Koos' study of "Regionville" provides many striking illustrations. One mother from the upper class, who had called in a doctor to see her son who had chicken-pox, explained that her reason was not that she had thought the disease serious; for she had had chicken-pox during her childhood, and had never been attended to by a doctor. The reason given for her action was: "Its just something you are expected to do." The mother further explained that the members of one of her reference groups - the local bridge club - would think she was neglecting her son if they found out that his chicken-pox was not being treated by a doctor. There was also the housewife from Class III (Lower Class) who had never known her mother to visit a doctor because of a backache, and did not see why she should visit the doctor for such a complaint. Furthermore, she said: If I went to the doctor for that, my friends would hoot me out of town.....".[56]

These two illustrations of what different social groups thought about their health and the response they make, can also be viewed in the context of differing values, attitudes and beliefs. It can be argued that the Class I mother called in a doctor because she was aware of what constituted good health practice; that she had perceived the organic need, and had evaluated a number of possible alternative

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[56]Koos, Earl Lomon, op. cit., Ch. III.

actions, and had acted in the way she did on the basis of what she thought was best. The Class III mother, although perceiving the need either did not know what constituted good health practice; or if she did, placed a different value on professional health care. In any case what seemed significant in both situations was the practice of the actors' reference groups as well as the latter's belief as to what was 'right'. Both mothers, it would seem, placed a higher value on what the group thought than on their own perception of the organic need involved.

Similar in influence to the small interacting reference groups, but different from them in that there might be no physical interaction between their members, are those larger groups within society referred to as sub-cultures. Many writers have drawn attention to the values of people sharing a common cultural orientation and patterns of behaviour which set them apart from other segments of the society. In the inimitable phrase of Riesman, persons who share a common cultural orientation have the tendency to be "sensitized to the expectations and preferences of others."[57] Thus members of the same ethnic group, the same profession, or the same age-sex group, tend to dress alike, patronize the same type of sports, and even tend to have common health values.

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[57]Riesman, David; Glazer, Nathan; and Denny, Reul: The Lonely Crowd, New York: Doubleday & Company, Inc., 1953, p. 38.

This special characteristic of sub-cultures is illustrated by Parsons in this thesis on the adolescent sub-culture of the United States of America. He points out that that sub-culture manifests a unique set of social values which differ from those of adults. Among other social values, the adolescent is said to place a high importance on social activities in the company of the opposite sex; and girls are said to value physical attractiveness in various versions of what is called the 'glamour girl' pattern.[58]

The relevance of this view to health behaviour in general, and to dental care in particular, is that since physical attractiveness (of which the teeth is one aspect) is positively sanctioned by the members of the adolescent sub-culture, in order to have the group's approval, members will tend to follow the practices prescribed by it. Variations in the utilization of dentists' services among various age-groups can, therefore, be seen as a manifestation of the relative importance of physical attractiveness to the various age-sex groups.

Besides the influence of reference groups on health behaviour there is a variety of other societal forces which are working to influence health beliefs and attitudes and the concomittant behaviour. Two alternative systems of

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[58] Parsons, Talcott, "Age and Sex in the United States," American Sociological Review, 7: 1942. pp. 604-614

response to illness cited below illustrate the nature of the societal forces referred to here.

The first of these we will refer to as medical science -- that complex of knowledge, technology, and the skilled individuals with specialized roles connected with the art of healing or preventing diseases. Although medical science is held in great respect by some sections of the general public there are segments of the population who rarely or never utilize its services. For example, it was recently stated that, in respect to dental care, at least one-half of the children in the United States has never visited a dentist although estimates from objective studies suggest that the need for dental care is overwhelming.[59] Since no social group displays complete acceptance of medical and dental practices for their health needs, their health response patterns might be said to stem from a divergence of values, beliefs and attitudes between the lay public and the medical and dental professions. For, if everyone placed a high value on health, was well-informed about diseases, believed in the efficacy of medical science, and was ready and willing to use it for all their health needs, the maximum standards of medical care could be achieved.[60] But it is rare indeed to

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[59] Garth, William A., President: American Dental Association, Radio Interview (CKY) 27th December, 1966.

[60] Lamb, Sylvia and Solomon, David N., The Social Behaviour Surrounding Children's Health Problems, Canadian Conference on Children, Quebec City, 1965, p. 36.

find an individual who relies entirely on scientific medicine in his responses to health problems.

A second category of responses to health is related to what is sometimes termed popular health culture or folk medicine. This includes value orientations, notions, and behaviours pertaining to self-addressed and lay action situations on the one hand, and to the client's part in the professional action situation on the other.[61] Evidence of popular health culture can be seen in the medicine chests and on kitchen shelves of nearly every household; in the verbalisations individuals make, and in the self-medications people apply and in the advice they so readily offer to the sick. While part of this repertoire of folk medicine has either been derived or adopted from medical science, a large part has grown out of the notions, value orientations and beliefs which segments of the society or the whole society has about human nature, the human body and their relation to the universe.

We find, therefore, that where human nature is perceived as evil, illness and disease will be seen as justly deserved by man, and any health action taken will be merely palliative and directed toward seeking release from the

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[61] Polgar, Steven, "Health Action in Cross-Cultural Perspective, "Handbook of Medical Sociology, (eds.), Freeman, Levine and Reader. Prentice-Hall Inc. 1963, pp. 401-408.

human condition. A different type of response will be made by those who see human nature as neutral or as a mixture of good and evil. Such action will be taken as will help the better parts of the body to prevail. Similarly, if the relation between man and nature is seen as one of subjugation, he petitions the forces of nature to give him health or relieve him from illness; but where man is seen as having mastery over nature, this leads to the "big stick" approach.[62] In these circumstances every perceived ailment is attacked with all the armoury of medical science along with a not too judicious mixture of pseudo-medical nostrums.

It has also been said that the temporal focus of social groups affect their behaviour; that is, the type of action taken in a given situation depends upon whether or not the present, the past or the future is most important to the actor.[63] Where people are preoccupied with satisfying such basic human needs as food and shelter they tend to be concerned more with the relief of immediate symptoms and pay little attention to long term health care as contrasted to future-oriented individuals and groups.[64]

In so far as the preceding arguments are relevant to

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[62]Kluckhohn, F. R., and Strodtbeck, F. L., Variations in Value Orientations. New York: Harper and Row, Publishers 1961. p.13

[63]Ibid., pp. 13-15.

[64]Polgar, op. cit., p. 405

dental health action, the point of view being taken here is that the type of action taken depends upon a variety of socio-cultural and social-psychological factors; that is, voluntary dental action is a function of the actor's perception of the need, the expected behaviour in terms of his social roles, as well as the alternative responses available to him in the light of the cultural tradition. All these variables interact upon one another and on the potential actor, thereby conditioning his readiness to act and the subsequent action.

Kegeles has analysed the concept of the individual's readiness to act in terms of the feeling of susceptibility to dental disease or illness, its severity, the percention of benefits which will result from his seeking to prevent or alleviate the seriousness of the disease, and finally the salience of the disease.[65]

Susceptibility was defined as "the belief that 'an event can happen to you'". This feeling of susceptibility could come about either because the individual knows that people in general have been afflicted in this way or because he knows people who have been so afflicted. The feeling could also come about as a result of the individual's past affliction by the disease. Since the majority of studies dealing with the problem of dental illness have

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[65]Kegeles, Stephen, S., op. cit., pp. 1308-1310.

shown that people possess the feeling of susceptibility, the barrier to periodic regular dental visits must be sought elsewhere.

If an individual recognises a disease as "clinically severe, with all of its symptoms, and likely to interfere with things considered important to him,"[66] such a disease is said to be severe for the individual. Various studies[67] indicate that a relatively large proportion of people do not see dental disease as a serious problem that could interfere with their jobs or their social activities, and so periodic regular check-ups are neglected.

The salience of dental disease is an additional motivating factor influencing the individual's action. Kegeles defined salience as "the feeling that doing something about the disease is more important than doing any other thing at some particular moment."[68] It follows from the preceding discussion on the severity of dental diseases that since it does not constitute a serious problem for many persons, action to alleviate the condition would not be considered salient. It appears that relative to other goods and services, regular dental care does not rank high on people's scale of

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[66]Kegeles, Stephen S., Ibid., p.1309

[67]Freidson and Feldman, op. cit., pp. 325-335; Koos, op. cit., pp.118-125.

[68]Kegeles, op. cit., p. 1308.

preferences. Note, for instance, the following comment by a housewife: "There is this television coming before long, and I'd rather have that -- and some other things -- than all my teeth."[69]

In addition to the foregoing propositions, Kegeles argues that a component of the readiness to take voluntary dental action is a knowledge of which practices to follow and the belief that following those practices is more beneficial than not following such practices. All these he subsumes under the concept of perception of benefits. This writer is extending the latter concept to cover not only the preventing and alleviating of organic mal-functioning, but also securing of social acceptance which may follow from conforming to those practices positively sanctioned by one's reference groups.

More specifically, the writer feels that while the individual's decision to seek periodic dental care might be influenced by his knowledge of what is professionally recommended and his beliefs about such recommendations, the influence of such other factors as the expectations attached to one's social roles (in terms of age-sex groups, occupational group) and the emotional set of the individual seem to merit further investigation. Thus, if periodic care is the norm of groups with which one identifies or aspires to

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[69]Koos, op. cit., p. 125.

whether or not he knows and believes in the professionally recommended practices, because a given practice is "what is expected of you" it is likely that, other things being equal, the practice will be followed by group members.

Finally, along with susceptibility, severity and salience, and such situational factors as cost of dental care, fear of pain seems on the basis of a few studies, to affect people's decision to seek regular dental care. Data from one of Friedson's studies indicate that fear of the dentist and of the pain he is said to inflict might be a strong deterrent to clinical dental care.[70] The evidence in this direction, however, is weak. Kegeles and Galblum found that children with strong internal desires for orthodontic care co-operate well in treatment even though they perceived treatment as being very uncomfortable to them.[71] But like socially transmitted traits it seems possible that fear of the dentist may be transmitted with specific reference groups from the older members to the younger ones, as well as during the first visit to a dentist, if the experience from that visit was an unpleasant one.

Given the preceding considerations, the present study sought to investigate the relationship between dental health behaviour on the one hand, and beliefs, attitudes,

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[70]Friedson and Feldman, op. cit., p. 333.

[71]Kegeles, op. cit., p. 1310.

and socio-economic variables on the other.

HYPOTHESES

The foregoing discussion seems to indicate that voluntary dental health action -- the seeking of regular periodic dental care -- is associated with a number of social and psychological, as well as socio-cultural variables. For example, we have seen that some individuals tend to respond to dental disorders and other aspects of somatic illness in the light of the values and expectations of their reference groups; that is, those groups with which they identify or aspire to relate their identity. Individual differences in the personality make-up were seen to influence the decision which some people make in seeking dental care, in the sense that fear of the dentist and the pain he is thought to inflict sometimes resulted in the postponement of needed dental attention. Also, on the basis of the literature reviewed, it appears that attitudes toward, and demand for, dental care are conditioned by the socio-economic factors of age, sex, education, and level of income of the actor.

For these reasons, and for the purposes of this study we therefore predicted that:

1. Attitudes toward dental care are related to the source from which one obtains dental care; that is, persons served by the Dental School Clinic tend to have a more positive attitude toward dental care than non-clinic patients.

2. Attitudes toward dental care will be more positive among adolescents than adults.

3. Attitudes toward dental care will tend to vary with sex: that is, females will be more predisposed to seeking regular periodic dental care than males.

4. Individuals in the higher income groups are more predisposed to seeking regular periodic dental care than those in the lower income groups.

5. The higher the level of education the more positive is the attitude toward dental care.

6. The demand for dental care is greater among Clinic patients than among non-clinic patients.

7. The demand for dental care is greater among females than among males.

8. Demand for dental care is greater among individuals in the higher income groups than in the lower income groups.

9. A greater proportion of persons in the higher educational categories are likely to demand regular dental care than persons with less education.

10. The demand for dental care is greater than the dental manpower available to meet that demand.

CHAPTER IV

RESEARCH DESIGN

The major portion of the study was designed to investigate the relationship between attitudes toward, and demand for and utilization of, dental care on the one hand, and the source of dental care on the other. Since a number of previous studies on dental care indicated that various socio-economic and social psychological variables such as age, sex, income, education and social class values influence all kinds of social behaviour, those factors were investigated in order to discover the extent of their effect upon utilization patterns and attitudes.

Demand for, and utilization of any good or service is related to the supply or availability of that good or service. In the light of this fact, the study also attempted to estimate the differential between supply of dentists' services and demand for these services in terms of total visits accommodated, type of services, and patient-visits sought during a given period of time and the frequency of visits.

Population and Samples

Three samples, consisting of individuals ranging between the ages of 6 and 60 years old were studied, but the central concern of the study was with the 13 to 19 age group. Hereafter, this group will be referred to as the adolescent age-group .

The first of these samples consists of 149 persons who were drawn from the clinic population of the University of Manitoba Dental School. This sample consists of males and females between the ages of 6 and 60 years old. They are located in all parts of Metropolitan Winnipeg. The second sample, designated the 'control group' consisted of 140 adolescents, male and female, aged 13 to 19 years old, and these were drawn from three public high schools in the Winnipeg school system: they were selected to represent three more or less different socio-economic areas in the city. The third group represents a portion of the sum total of a group of adolescents making their first visit to the Dental School clinic.

Sample Design

Both the 'experimental' clinic sample and the non-clinic 'control' sample were stratified by age and sex and the individual units chosen by a random method. These samples represent 10 per cent and 5 per cent of the respective populations from which they were chosen. Therefore the ratio of each sub-sample to the sample is equivalent to the ratio of each stratum to the over-all population. Thus the final clinic sample consists of 55 per cent females and 45 per cent males. 35 per cent of the females were over 20 years old and 20 per cent were under 20 years old, while 25 per cent of the males were over 20 years old and 20 per cent were under 20 years old.

Rationale for Sample Size and Design

Although statistical theory provides the researcher with tools and techniques which make it possible for him to decide on an ideal sample size, and so increase the accuracy of probability statments made about the parameter being studied, those techniques can only be applied after the researcher knows certain facts about the population to be studied. He must know, for example, or have an estimate of, the proportion of the population likely to have the attribute being studied; the standard deviation or amount of variation on the attribute between the groups, the difference between the means of the attribute, as well as, an estimate of the standard error of the difference the means.

When there are previous studies from which such data may be obtained, there is no problem in estimating the ideal sample size. At present, however, such studies are not available. In practice, therefore, the researcher chooses by random sampling, "the largest sample financially possible and discard questions on which a much larger sample would be needed to give useful results."[72] Such other practical considerations as the physical distribution of the research population, the characteristics to be studied, the time available for the research, and resources at the disposal

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[72]Moser, C. A., Survey Methods in Social Investigation, Glasgow: The University Press, 1958, p. 119.

of the investigator usually influence decisions on sample size.[73]

In view of the physical distribution of the sample population in this study and the limited research time available to the investigator, as well as the fact that the personnel for the field work consisted of a single interviewer, the original samples chosen consisted of 100 persons from the 'experimental' clinic population and 185 persons from the 'control' non-clinic population. However, through the loss of a number of units as a result of refusals the final samples consisted of 100 persons from the experimental group and 140 persons from the control group. Both samples represent 10 and 5 per cent of the respective populations from which they were drawn. The third group studied will not be dealt with in this report.

But in order to increase the precision of the results based on these samples, the investigator employed a proportionate stratified random design for choosing the sample units. Statisticians agree that this type of design "is almost certain to be an improvement on a simple random design because it makes sure that the different strata in the population (sexes, age-groups....and the like) are correctly represented."[74]

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[73]Festinger, Leon and Katz, Daniel, Research Methods in the Behavioral Sciences, pp. 173-239.

[74]Moser, C. A., op. cit., pp. 78-80.

While the validity of the results obtained from comparing two proportionally unequal samples may be questioned, it must be pointed out that where the samples are drawn from different populations and when the variables under study are controlled the results are unaffected. In fact, when the use of two related samples is impracticable or inappropriate, one may be obtained by either of two methods: (a) they may each be drawn at random from two populations, or (b) they may arise from assignment at random of two treatments to members of some sample whose origins are arbitrary. In either case it is not necessary that the two samples be of the same size.[75]

Collection and Processing of Data

There were three stages in the collection of data: firstly, dental health data were collected by reviewing the dental records of 143 patients registered at the University of Manitoba Dental School clinic; secondly, a 10 per cent sample of the patients whose records had been reviewed was selected and sociological data collected from interviews with the individuals in that sample.

A similar technique was applied in collecting data from the control group. Following the selection of a stratified random sample of 185 adolescents from the class

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[75]Siegel, Sidney, Non-parametric Statistics for the Behavioural Sciences, 1956, pp. 95.

lists provided by principals of the three schools selected, dental health data and sociological data were collected by written questionnaires completed by the respondents after detailed explanation by the author and two dentists involved in the project. At the completion of the interview, which lasted for approximately half-an-hour, the respondents were invited to visit the Dental School clinic for a full mouth X-ray.

The clinical examinations of the control group were aimed at providing dental health data comparable to those obtained from a review of the records of the clinic patients.

The final form of the instrument used for collecting the research data was divided into three sections: Section A was concerned with social stratification data (age, sex, education, occupation, and income). Section B related to the respondents' past dental history and their self-appraisal of their present dental health, while Section C consisted of twenty-six attitude statements and questions arranged into agree-disagree or other forced-choice categories in a Likert-type attitude scale. Altogether, the questionnaire consisted of fifty-six questions and statements.

In order to arrive at the final questionnaire a total of eighty-five questions and statements relevant to dental care were collected from dental journals and other sources and assembled in a questionnaire. These were submitted to four persons involved in the practice of dentistry, the

teaching of dental health education and who had had experience in constructing questionnaires for social surveys. A number of adjustments had to be made to the original list of questions to provide for greater clarity and simplicity of the wording. At the same time some of the questions were eliminated and new ones were added. Before the pre-testing stage was reached, the draft questionnaire comprised a total of eighty-five questions.

These eighty-five questions were then pretested on a group of 102 persons at the Dental School clinic during September, 1966. At this stage further adjustments were made, eliminating irrelevant categories of forced responses and adding new categories suggested by the respondents. The attitude section which had the Likert-type five-point response categories was then scored, and the upper and lower 20 per cent of the scores selected. Each respondent's total score on the individual items was then computed, as well as the mean scores of the individuals in the two selected groups. The difference between each pair of means provided an <u>index of the discriminatory power</u> of the items to separate respondents with a favourable attitude toward dental care from those with unfavourable attitudes toward dental care. The twenty-six items with the highest discriminatory indexes were then chosen and incorporated into the final attitude scale. No item with a discriminatory index below 0.5 was selected for the scale; in fact, each of the items selected

for the final scale had a discriminatory index ranging from 0.65 to 1.65.

During the period October 1966 to January 1967 the author interviewed the subjects in the sample.

Part II of the study was designed to study the supply of dentists' services and estimate the differential between supply and demand for those services. Data on the supply of dentists' services were obtained from a second questionnaire consisting of ten items. This questionnaire was mailed to a random sample of 76 dentists drawn from the classified section of the telephone directory.

This questionnaire consisted of questions relating to: the amount of time devoted to practice (number of hours per week, number of weeks during 1965); the actual or estimated number of patients treated during 1965 and the number of patient-visits each dentist had during that year. Other questions were asked about the type of practice, ability to accommodate new patients, and the length of time patients had to wait for an appointment.

Data on dental health needs of the clinic patients, as diagnosed by the clinic personnel, were transferred from the individual schedules to a single worksheet. Dental needs were then categorised into seven classes: caries, periodontal diseases, malocclusion, prosthodontic need, endodontic need, the need for oral surgery and crown and/or bridge service. The number of persons in the sample population with each of the specified needs

was then distributed according to age and sex. Each of the original patient schedules was then checked beside the work-sheet to ensure that the data on both sets of schedules were identical. Following this the percentage distribution of the population with each type of dental disorder was calculated.

IBM data processing techniques were utilized in sorting and tabulating the data collected on the interview schedules; and for this operation the services of the Computing Centre of the University of Manitoba were obtained. After the investigator had editted and coded the schedules they were given to an experienced punch card operator who transferred the data on to 80-column IBM cards. The data on each card were then verified against its corresponding schedule, and following this the cards were sorted and the data arranged into frequency distribution tables. All the statistical operations were carried out by the investigator on a desk calculator.

The data collected on the supply of dentists' services were transferred from the original schedules to a single work sheet. Following this dentists were categorised into five age-groups ranging from "under 30" to "60 and over". Age was then cross-tabulated with the objective and subjective measures of supply of dentists' services. These measures include amount of time (hours per week, weeks per year) offered during 1965, as well as the total number of patients attended to, the aggregate number of patient-visits (sittings) each dentist had for the same period, and the dentists appraisal of their ability to accommodate additional patients.

Reliability and Limitations of the Measurements Attempted

To study the extent of dental health needs solely from the personal assessment of the respondents could lead to a distorted picture of the objective conditions, since it is not always possible for even dentists to detect a defect which has not been submitted to x-ray. The possibility of misrepresenting the state of the dental health of the persons studied was obviated or at any rate, greatly lessened by the present method which took into account both the personal assessment and the clinical examinations.

Reliability as far as the measuring of attitudes are concerned always presents a problem, for here we are dealing with intangible variables. Moreover, it is difficult to make measurements of human response under constant conditions. Commenting on this problem Moser states that "even if people were to submit themselves to repeat questioning, a comparison of the two sets of results would hardly serve a valid test of reliability, since they could not be regarded as independent."[76] Notwithstanding these practical problems encountered in providing tests of reliability, several statistical tests have been applied for this purpose. And for the purposes of this study the most generally used test of reliability -- the "split-half" technique -- was used in computing a reliability index.

The scores on the 13 odd-number items and those of the 13 even-number items in the scale were computed from

[76] Moser, C. A., Survey Methods in Social Investigation. Heineman Educational Co., 1958, pp. 242.

the pre-tested questionnaire. The Pearson Product-moment co-efficient was then computed from these scores, and the size of the resulting coefficient was 0.65.

Although some experts on scale construction have expressed the opinion that for a scale to be useful the co-efficient of reliability should not be less than 0.80, a number of standardized scales[77] have a reliability co-efficient smaller than the 0.65 obtained on the present test.

Design of Statistical Analysis

Because of the essentially non-quantitative nature of the variables studied in this research, as in most sociological studies, it was decided that the data collected should be analysed by contingency methods. "The methods of contingency are more useful in sociological research than in other more advanced fields of research where devices for precise measurement have been developed to afford data of the quantitative variable type on a greater proportion of the phenomena of interest."[78] In the present circumstances where the classifications are age-sex groups, as well as favourable and unfavourable attitudes, and the relationship between any two of these, the methods of contingency appear

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[77] Miller, Delbert C., Handbook of Research Design and Social Measurement: New York, David McKay Co., Inc. 1964, pp. 124; 140; 193.

[78] Hagood, M. J. and Price, D. O., Statistics for Sociologists, Holt, Rinehart and Winston, New York, 1952, pp. 356-376.

appropriate for analysing the data.

The first operation undertaken was the computation of the combined median score for the 'experimental' and the 'control' groups. Persons obtaining a score above the median were designated "high" scorers and were taken to represent positive or favourable attitudes toward dental care. (On the scale these scores represent those persons who had consistently scored 4 or 5 points for the items.). Scores below the median were designated low scores.

The Chi-square test of association was applied to discover whether or not there was any association between source of dental care and attitudes. A similar operation was carried out in respect to demand for (frequency of visits), and attitudes toward, dental care.

Following this source of dental care was controlled and the various dimensions of socio-economic status (age, sex, education, occupation and income) were tested in order to trace the influence they have on attitude toward and demand for dentists' services. In all of these cases the existence, direction, and nature of the association between the socio-economic variables and the attitude ratings and frequency of visits were analysed in terms of the Chi-square test.

With regard to Part II of the study -- the differential between demand for, and supply of, dentists' services -- the mean number of patients and patient-visits reported by the sample of dentists who returned completed questionnaires

were classified according to age of dentists. Following this, an estimated total number of patients and patient-visits accommodated during 1965 by the 203 dentists listed in the telephone directory was estimated.

On the basis of the estimated total number of visits accommodated by the dentists (supply) and the number of patient-visits sought (demand) the supply of dentists needed to meet potential demand in terms of the population (age 4 years and over) was estimated, and the difference between the known and the estimated supply calculated.

CHAPTER V

PRESENTATION OF RESEARCH DATA

One of the stated objectives of the original proposal called for a comparison of the clinically diagnosed dental needs of the 'experimental' clinic group and the non-clinic 'control' group. Diagnosis of the dental needs of the latter group, which is being undertaken by the Clinic personnel at the Dental School, could not be completed in time for this report owing to the difficulty of getting those respondents who had participated in the first phase of the study to report to the Clinic for oral and X-ray examinations. For that reason, this section of the presentation will be confined to the dental needs of 149 clinic patients whose records were reviewed prior to the collection of interview data.

Following the presentation and analysis of this information, the interview data collected from 100 clinic patients and 140 non-clinic patients will be presented on:

(1) Attitudes toward professional dental care;

(2) Time elapsing since the last visit to the dentist;

(3) Frequency of visits to the dentist.

Data on the supply of dentists will be presented also from questionnaire data returned by a random sample of dentists who practice in Metropolitan Winnipeg. These data will deal with:

(a) The number of patients and patient-visits received during 1965;

(b) Type of practice offered by the dentists;

(c) Dentists' ability to accommodate additional patients;

(d) The length of time patients wait for an appointment.

Dental Needs of 149 Persons Served by the Dental School Clinic of the University of Manitoba.

The dental records of 149 persons, 71 males and 78 females disclosed that treatment was being sought for a variety of oral disorders. 110 of these patients (73.8%) required treatment for the control of caries; 60 persons (40.0%) were being treated for, or needed treatment because of, periodontal disease, and 35 persons (approximately 23 per cent) required prosthodontic treatment.

Table 1, page 57, presents the percentage distribution of patients with the specified need according to age-group.

Caries Treatment:- The need for this service is highest among the "under 13" age-group, where approximately 85 per cent of that sub-sample need treatment for caries-infected teeth, and the lowest percentage of cases (approximately 33 per cent) was found among the "50 and over" age-group. As shown in Table 1, there is a tendency for the need for caries treatment

TABLE I

*PERCENTAGE DISTRIBUTION OF PATIENTS NEEDING DENTAL CARE

BY TYPE OF NEED AND AGE

(CLINIC GROUP)

Age Group	No. of Persons in the Sample	Percentage Needing													
		Caries Treatment		Periodontal Treatment		Mal-Occlusal Treatment		Prostho-dontic Treatment		Endodontic Treatment		Oral Surgery		Crown and Bridge	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Under 13	26	23	84.6	1	3.7	15	57.7	2	7.4	2	7.4	6	23.0	1	3.7
13-19	48	39	81.3	8	16.7	21	43.8	3	6.3	19	39.4	6	12.5	17	36.7
20-29	22	18	81.8	13	60.0	6	27.3	2	9.1	4	18.1	3	13.6	10	45.5
30-39	22	17	77.2	20	90.0	8	33.3	5	22.7	3	13.6	4	18.1	11	50.0
40-49	16	8	50.0	11	68.8	1	6.3	11	68.8	2	12.5	3	18.8	5	31.3
50 and over	15	5	33.3	7	46.7	1	6.7	12	80.0	2	13.4	5	33.3	4	26.7
Totals	149		73.8		40.2		35.0		22.8		21.4		18.1		32.7

*"Percentage" means the percentage of the patients in the given age age-groups requiring the specified dental service listed.

to be inversely associated with age; that is, the need is progressively greater at each of the lower age levels. It should be noted, however, that the data do not show any clear-cut difference between the percentages of persons in the first four age-groups with respect to the need for caries treatment. On the average, 81 per cent of the persons in each of these age-groups needed treatment, and the percentage deviation ranges from 0.1 to 3.4 per cent.

However, after age 39 years there is a sharp decrease in the percentage of persons needing treatment for caries; in fact, the data show that one and a-half times as many persons in the "30 to 39" age-group (77 per cent) as in the "40 and over" group (50 per cent) require treatment for dental caries.

Periodontal disease:- All kinds of gingival defects have been included in this category. The data show a rising incidence of periodontal disease among the patients after age 13 years, with over 90 per cent of those in the "30 to 39" age-group experiencing the disease. After age 39 the incidence recedes; and there is a marked decline of the disease from age 50 onwards. Presumably, the explanation lies in the fact that 80 per cent of the people studied in this age-group had lost most of their teeth. It should be noted that most of the 80 per cent in this category needing prosthetic treatment either wore dentures or needed dentures.

Malocclusion:- Approximately 35 per cent of all the patients need treatment for malocclusion, with more than one-half of the "under 13" age-group (57.7 per cent) needing the treatment. After that age the incidence declines until age 30, when the incidence again rises and continues to rise until age 39. One-third of the patients in the "30 to 39" age-group needed treatment for malocclusion. Beyond age 39 the decline sets in again, and at age "50 and over" only 6 per cent of the sample studied needed treatment for malocclusion.

Prosthodontic Treatment:- The pattern of need for this service is the reverse of that shown for caries treatment; that is, the need for prosthetic restoration tends to be positively associated with age: the percentage of persons needing prosthetic restoration increases as age increases. Thus, while under 7 per cent of the persons in the "13 to 19" age-group needed the service, the percentages in the other age-groups increased steadily as age increased; and at age "50 and over", 80 per cent of the patients needed prosthetic restoration.

Endodontic Treatment:- Twenty-one per cent of all the patients studied needed treatment for problems involving the pulp; but the need was greatest among the "13 to 19" age-group, where roughly 40 per cent needed treatment. The need was lowest among the "under 13" age-group which accounted for less than 8 per cent of the cases. Beyond age 19, the need for endodontic treatment decreased appreciably, to 18 per cent, and at age 30 and onwards the need remained stable at approximately 13 per cent for each of the remaining three age-groups.

Oral Surgery:- The need for oral surgery was greatest among the "50 and over" age-group, followed by the "under 13" age-group. In both these age-groups 33.3 per cent and 23 per-cent of the patients in the respective groups needed the service. Among the intermediate age-groups the need ranged from 13 per cent of the cases in the "13 to 19" age-group to 19 per cent in the "40 to 49" age-group.

Crown and Bridge:- Nearly one-third of the sample needed crowns and/or bridges. This need was found to be greatest among the "30 to 39" age-group, followed by the "20 to 29" age-group. In each of these groups 50 per cent and 46 per cent, respectively, needed crowns and bridges. Except for the "under 13" age-group where one 12 year old needed replacement of one or more crowns, the need for crowns and/or bridgework in the rest of the sample population was lowest among the "50 and over" age-group (under 27 per cent), followed by the "40 to 49" age-group where the incidence of need was roughly 31 per cent.

Age and Sex Distribution of Dental Needs:- Dental needs, as indicated in Tables I-II, vary according to age and sex of the sample studied. Table III, page 63 presents the age distribution of dental needs among the male sub-sample of the survey population.

Dental Caries:- The age-group with the highest percentage of persons suffering from caries is the "13 to 19" group, while the lowest percentage occurs within the "50 and over" age-group. The picture was somewhat similar when dental needs were examined from the standpoint of the over-all population.

TABLE II

DENTAL NEEDS OF 149 PERSONS BY SEX AND TYPE OF NEED

Sex	No. of Persons in the Sample	Number and Percentage Needing						
		Caries Treatment	Periodontal Treatment	Mal-occlusion Treatment	Prostho-dontic Treatment	Endodontic Treatment	Oral Surgery	Crown and Bridge
Males	71	52 (73.2)	25 (35.2)	27 (38.0)	14 (19.7)	18 (25.4)	11 (15.7)	22 (31.0)
Females	78	58 (74.3)	35 (44.8)	25 (32.0)	20 (25.7)	15 (19.0)	16 (20.5)	27 (34.6)
Total	149	110 (73.8)	60 (40.0)	52 (35.0)	34 (22.8)	33 (22.1)	27 (18.1)	49 (32.7)

Note:- The figures in brackets represent the percentage of persons with the specified need.

studied. Nearly three times as many males in the "13 to 19" age-group (82.7 per cent), need treatment for caries as there are in the "50 and over" (28.6 per cent). For the remaining four age-groups, the percentage of males within each group needing caries treatment ranges from 50 to 81 per cent.

Periodontal Disease:- Approximately 35 per cent of the male patients (35.2 per cent) in the sample need treatment for periodontal disease with the highest percentage of cases (83 per cent) occurring among the "40 to 49" age-group and the lowest percentage of cases (9 per cent) occurring among the "under 13" age-group. As with the over-all population, the incidence of the disease among the male sample rose gradually after the age of 13 years until age 49 years. Thereafter, a sharp decline sets in, and among the "50 and over" age-group the incidence of periodontal disease fell to one-third of the percentage found in the "40 to 49" age-group.

Malocclusion:- The incidence of this disorder was highest among the "under 13" age-group and lowest among the "50 and over" age-group. Nearly 64 per cent of the males in the pre-adolescent group needed treatment for the disorder. The percentage of males with malocclusion declined gradually at first, up to age 29, but after that age the decline became quite sharp and by age "50 and over" there was no occurrence of the disorder.

Prosthodontic Treatment:- The need for prosthetic restoration was highest among the "50 and over" group, with

TABLE III

DENTAL NEEDS OF 71 MALES BY AGE AND TYPE OF NEED

Age Group	No. of Persons in the Sample	Percentage of Persons Needing:													
		Caries Treatment		Periodontal Treatment		Mal-occlusion Treatment		Prostho-dontic Treatment		Endodontic Treatment		Oral Surgery		Crown and Bridge	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Under 13	11	9	81.8	1	9.0	7	63.6	1	9.0	2	18.0	2	18.0	--	--
13-19	29	24	82.7	5	17.2	14	51.7	1	3.4	11	37.9	3	10.3	9	31.0
20-29	8	6	75.0	2	25.0	3	37.5	--	--	--	--	1	12.5	4	50.0
30-39	10	8	80.0	8	80.0	2	20.0	3	30.0	1	10.0	3	30.0	6	60.0
40-49	6	3	50.0	5	83.3	1	16.7	3	50.0	2	33.3	--	--	2	33.3
50 and Over	7	2	28.6	2	28.6	--	--	6	85.7	2	28.6	3	43.0	1	14.3
Total	71		73.2		35.2		38.0		19.7		25.4		15.7		31.0

almost 86 per cent of that age-group requiring partial or full dentures, and the lowest percentage of males with the need was among the "20 to 29" age-group, followed by the "13 to 19" age-group. Actually, there is no need for prosthetic restoration in the "20 to 29" age-group. Nearly three times as many males in the "50 and over" age-group (86 per cent) as in the "30 to 39" age-group (20 per cent) require partial or full dentures.

Endodontic Treatment:- One-quarter of the males studied needed endodontic treatment. No pulp problems were encountered among the "20 to 29" age-group. For the remaining age-groups, the incidence of pulp diseases, roughly 38 per cent, was highest among the "13 to 19" age-group, and lowest (10 per cent) among the "30 to 39" group. While the need for endodontic treatment was highest among the male adolescents approximately 30 per cent of the male adults in the "40 to 49" and the "50 and over" age-groups required treatment.

Oral Surgery:- Of the 16 per cent of the males needing this service, the "50 and over" age-group accounted for 43 per cent, followed by the "30 to 39" age-group with 30 per cent of the cases needing the service. There was no need for oral surgery among the "40 to 49" age-group, and the incidence was lowest, 10 per cent, among the adolescent group. Among the pre-adolescent group the need for oral surgery was found in 18 per cent of the males studied.

Crown and Bridge:- Thirty-one per cent of all the

males needed crown and/or bridge service. The need was greatest among the "30 to 39" age-group, where 60 per cent of the patients needed the service and lowest among the "50 and over" group where less than 15 per cent of the group had this need. Except for the youngest age-group where the need for crown and/or bridge service was non-existent, more than 30 per cent of the males in each of the other age-groups needed this service.

Females

Dental Caries:- As shown in Table IV, page 66, over 74 per cent of the females studied needed treatment for caries, the incidence of which appear to vary inversely with age. Over 93 per cent of the females "under 13" years old needed treatment for the disease compared with approximately 38 per cent of those in the "50 and over" age-group. For the remaining age-groups, the percentage of females in each group needing treatment for caries ranges from 50 per cent in the "40 to 49" group to 85 per cent in the "20 to 29" age-group.

Periodontal Disease:- There is no occurrence of this disease among the "under 13" age-group. In the other age-groups the incidence of periodontal disease ranges from 16 per cent in the adolescent group to 83 per cent in the "30 to 39" age-group. The percentages of females among age-groups "40 to 49" and "50 and over" with the disease are roughly the same, 60 per cent and 62.5 per cent respectively.

Malocclusion:- According to the data, the need for treatment because of malocclusion tends to decline with increasing age. Females "under 13" accounted for over 53 per cent of those

TABLE IV

DENTAL NEEDS OF 78 FEMALES BY AGE AND TYPE OF NEED

Age Group	No. of Persons in the Sample	Percentage of Females Needing:													
		Caries Treatment		Periodontal Treatment		Mal-occlusion Treatment		Prostho-dontic Treatment		Endodontic Treatment		Oral Surgery		Crown and Bridge	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Under 13	15	14	93.3	--	--	8	53.3	1	6.7	--	--	4	26.7	1	6.7
13-19	19	15	79.0	3	15.8	7	36.8	2	10.5	8	42.1	3	15.8	8	42.1
20-29	14	12	85.7	11	78.6	3	21.4	2	14.3	4	28.6	2	14.3	6	42.9
30-39	12	9	75.0	10	83.3	6	50.0	2	16.7	2	16.7	2	16.7	6	50.0
40-49	10	5	50.0	6	60.0	--	--	7	70.0	1	10.0	3	30.0	3	30.0
50 and Over	8	3	37.5	5	62.5	1	12.5	6	75.0	--	--	2	25.0	3	37.5
Total	78		74.3		44.8		32.0		25.7		19.0		20.5		32.7

needing treatment compared with 13 per cent of those in the "50 and over" age-group. One-half of the females in the "30 to 39" age-group need treatment for malocclusion, but there was no occurrence of the disorder among the "40 to 49" age-group. Nearly 32 per cent of the combined sub-samples showed evidence of the need of correction for malocclusion.

Prosthodontic Treatment:- The need for this service is highest among the "50 and over" age-group where the need is more than twelve times as great (75 per cent) as among the "under 13" age-group where the need is lowest, (6.7 per cent). In each of the other age-groups, except the "40 to 49" group, approximately 13 per cent of the females need prosthetic restoration, but 70 per cent of the "40 to 49" age-group need this service. On the whole, just over 25 per cent of all the females studied need any kind of dentures.

Endodontic Treatment:- The percentage of female patients needing endodontic treatment fluctuates from one age-group to another, but the over-all need is not high relative to other needs. Neither the youngest nor the oldest age-group showed evidence of pulp diseases. Among the intermediate age-groups, the need for endodontic treatment ranges from 42 per cent of the "13 to 19" age-group to 10 per cent of the "40 to 49" age-group. As in the case with caries, the evidence suggests that the incidence of pulp problems tends to decrease considerably as age increases.

Oral surgery:- Twenty-one per cent of the females studied showed the need for oral surgery. Among the youngest

and the oldest age-groups the need is roughly the same: one-quarter of the females in each of these groups needed some form of oral surgery. The need for this service was nearly twice as great among the "40 to 49" age-group (30 per cent) as in each of the other age-groups where the need ranged from 14 per cent in the "20 to 29" age-group to 16 per cent in the "30 to 39" age-group.

Crown and/or Bridge:- One-third of all the females studied required crown and/or bridge service. The need was greatest among the "20 to 29" age-group, where 50 per cent of the patients needed the service, and lowest among the "under 13" group where less than 8 per cent of the group needed the service. Among each of the other age-groups more than 30 per cent of the females showed the need for crown and bridge replacements.

Dental Needs of Males and Females Compared

The data in Tables III and IV suggest that the need for caries treatment is somewhat higher among females in the pre-adolescent group and in the "50 and over" group than among males of the corresponding age-groups. The picture is much the same when males and females in the "20 to 29" age-group are compared. However, the need for caries treatment is slightly higher for males than females in the remaining age-groups. But the observed percentage difference between males and females with the need for caries treatment is not statistically significant. (See Appendix III).

Table II shows that nearly 10 per cent more females than males need treatment for periodontal disease. The youngest age-group in the female sub-sample had no occurrence of the disease,

but in the corresponding male sub-sample 9 per cent of the patients needed periodontal treatment. Twice as many females (62.5 per cent) as males (29 per cent) among the "50 and over" group showed evidence of the disease, and three times as many females (78.6 per cent) as males in the "20 to 29" age-group needed periodontal treatment. Among the female sub-sample the incidence of the disease was highest in the "30 to 39" age-group, and among the male sub-sample the incidence was highest in the "40 to 49" age-group. An examination of Appendix IIIC reveals that the association between sex and the incidence of periodontal disease is not a significant one.

In every age-group the need for orthodontic treatment is greater among males than among females. For both males and females the incidence of malocclusion is highest in the pre-adolescdnt group, but the need was 10 per cent greater among the males than among the females. Among the "50 and over" age-group neither males nor females showed any evidence of the disorder. As shown in Appendix IIIE, the association between sex and malocclusion is not statistically significant.

The need for prosthodontic treatment is highest among the "50 and over" group; but 10 per cent more males (85.7 per cent) than females (75 per cent) need this service. Although the need is relatively low among the adolescents, among females the need is more than three times as great (10.5 per cent) as among males (3.4 per cent). And while 14 per cent of the females in the "20 to 29" group needed some prosthodontic treatment, there was no need for this service among males in the corresponding group. Again the formal test of association failed to establish any significant

relationship between sex and the need for prosthetic restoration (See Appendix IIID).

Males more than females tend to need treatment of the dental pulp, and while 18 per cent of males in the "under 13" age-group need some treatment the need was non-existent among females in the corresponding age-group. For both sexes the need was highest among adolescents, but need was slightly higher among females (42 per cent) than among males (38 per cent). While 29 per cent of the males in the "50 and over" group needed endodontic treatment, there was no occurrence of the disease among females in the same age-group.

While 18 per cent of the survey population needed oral surgery, there were approximately 5 per cent more females than males that needed the service. Among the male sub-sample this need was highest in the "50 and over" age-group and lowest in the "40 to 49" group. One-quarter of the females in the "50 and over" age-group had need for the service, and in the "40 to 49" age-group nearly one-third of the females required similar treatment.

The need for crown and/or bridge service was higher for females than for males: 33.3 per cent of the females compared with 31 per cent of the males needed these services. For both males and females the need was negligible among the pre-adolescents; in fact the need was non-existent with respect to the males, and under 7 per cent of the females need for crown and/or bridge service. Males and females in the "30 to 39" age-group had the highest percentage of cases needing crown and bridge service, but the percentage was greater among the males (60 per cent) than among the females (50 per cent.).

Analysis of Interview Data:

Attitudes Toward, and Demand for, Dental Care

The previous section of this study presented the findings on data collected from the dental records of a random sample of 143 persons who attend the clinic at the University Dental School for treatment. This section will present and analyse data collected from interviews administered to stratified random samples 100 clinic patients and 140 non-clinic adolescents chosen from three public schools in the Winnipeg School System. Comparisons will be made between the two groups in respect to dental health behaviour.

Past studies have indicated that the demand for, and attitudes toward dental care vary with age. In view of this, a separate analysis involving clinic and non-clinic patients of a comparable age-group will be carried out so as to neutralize the possible effect of age variation. This operation becomes necessary in view of the wide variation in the ages between the clinic and the non-clinic samples. If age were not controlled differences found between the attitudes toward, and demand for, dental care of the two groups may be attributed to source of dental care, even though age might have been a significant intervening variable.

Following this, the other variables (sex, education, income) for which hypotheses were formulated, will be analysed in terms of their influence on attitudes toward, and demand for

dental care. The analyses will explore between-group differences as well as within-group differences.

Although no hypotheses had been formulated, during the design phase of the study, concerning the relationship between age at first visit to the dentist, occupation, fear of pain and, dental health behaviour, the preliminary analyses of the data indicated that those variables might be significantly related. The reality of the relationships has been formally tested, and these results also will be presented in this section.

Attitudes Toward Dental Care:

Hypothesis 1: The individual's attitudes toward dental care vary with the source from which he obtains dental care; that is, persons served by the Dental School Clinic tend to have more positive attitudes toward dental care than non-clinic persons.

TABLE V

RELATIONSHIP BETWEEN ATTITUDES TOWARD DENTAL CARE AND SOURCE OF DENTAL TREATMENT

Attitude Rating	Source of Dental Care		
	Clinic	Non-Clinic	Total
High	40 (40%)	76 (54.3%)	116 (48.8%)
Low	60 (60%)	64 (45.7%)	124 (51.7%)
Total	100 (100%)	140 (100%)	240 (100%)

$X^2 = 5.391$; DF = 1
$P < .05$ (one-tailed test)

Table V shows the distribution of clinic and non-clinic patients according to their attitude ratings on dental care. An examination of the Table reveals that 40 per cent of the clinic patients were rated "high" attitude scorers compared with 54.3 per cent of the non-clinic group. Conversely, 45.7 per cent of the non-clinic subjects obtained "low" attitude scores compared with 60 per cent of the clinic patients. In other words, while 40 per cent of the persons in the clinic group indicated a positive predisposition to seek regular periodic dental care, more than 54 per cent of the persons in the non-clinic group indicated a similar tendency. On the other hand, while 45.7 per cent of the latter group indicated a negative or unfavourable predisposition toward regular periodic dental care 60 per cent of the persons in the clinic sample indicated the latter tendency.

When the observed percentage differences between the attitude ratings of the two groups were submitted to the statistical test of association they were found to be significant at the .05 level of significance. As Table V shows, the direction of association between source of dental care and attitudes toward dental care is in favour of the non-clinic users; that is, non-clinic patients more than clinic patients are likely to have positive or favourable attitudes toward professional dental care.

A likely explanation underlying the direction of the association between source of dental care and attitudes toward

dental care seem to rest on the fact that the two groups are not comparable in terms of chronological ages, for the clinic group is comprised of persons between the ages of 6 and 80 years old, while the non-clinic group is comprised of adolescents aged 13 to 19 years. Secondly, the non-clinic dimension of the independent variable - source of dental care - would have been more meaningful had it been designated "persons with a family dentist". The data (Appendix IIE) show that more than 87 per cent of the non-clinic subjects have family dentists, whereas only 4 per cent of the clinic patients have family dentists. When this fact is considered along with possible effect of the age variation between the groups, it seems reasonable to accept that the non-clinic subjects under consideration, are more likely to be favourably disposed toward regular periodic dental care than the clinic users.

Despite the results of the first analysis, which established a significant association between attitudes toward dental care and non-use of the Clinic's dental services, Appendix IVA shows that when age is controlled for the relevant groups there is no significant association between source of dental care and attitudes toward dental care. In other words, the source from which adolescents obtain their dental care has negligible, if any, influence on their predisposition to seek regular periodic dental care.

Hypothesis 2: Attitudes toward dental care are more positive among adolescents than among adults.

Two separate analyses were performed exploring the relationship between age and attitudes toward dental care. In both cases source dental care was controlled. For the first analysis the clinic patients were classified into two age categories: "13 to 19" and "20 and over". 41 per cent of the adolescents obtained high attitude ratings compared with 34 per cent of the adults, while 65.6 per cent of the adults obtained low attitude scores compared with 59 per cent of the adolescents. However, these percentage differences did not result in showing a significant relationship between the attitudes of adults and adolescent who utilize the Clinic's dental services.

TABLE VI

RELATIONSHIP BETWEEN AGE AND ATTITUDES TOWARD DENTAL CARE

CLINIC GROUP

Attitude Rating	Age Group			
	13-19	20-39	40 and over	Total
High	16 (41%)	17 (45.9%)	7 (29.1%)	40
Low	23 (59%)	20 (54.1%)	17 (70.9%)	60
Total	39 (100%)	37 (100%)	24 (100%)	100
	$X^2 = 1.738$; DF = 2			
	$P > .05$ (one-tailed test)			

To obtain more reliable comparisons between the age groups the over-all sample was re-classified into three age groups and comparisons made between the separate groups. As shown in Table VI the analysis failed to establish any significant association between age and attitudes toward dental care.

Hypothesis 3: Attitudes toward dental care vary with sex: that is, females are more predisposed to seeking regular periodic dental care than males.

It is apparent, from the percentages presented in Table VII, that there is some association between sex and attitudes toward dental care. 43.6 per cent of the females and 35.6 per cent of the males in the clinic sample obtained high attitude scores, and 64.4 per cent of the males obtained low scores compared with 56.4 per cent of the females. But the formal test of association between the variables proved that the observed difference between the attitude ratings of the sexes is not statistically significant. This means that, within the Clinic group there is no difference between the attitudes of males and females toward dental care.

When the adolescent age group was isolated from the rest of the clinic group and exposed to the test of association, the results obtained (Table VIII) were similar to those presented in Table VII: there is no significant difference between the attitudes of males and females with respect to dental care.

TABLE VII

RELATIONSHIP BETWEEN SEX AND ATTITUDES TOWARD DENTAL CARE: CLINIC GROUP

Attitude Rating	Sex		Total
	Male	Female	
High	16 (35.6%)	24 (43.6%)	40
Low	29 (64.4%)	31 (56.4%)	60
Total	45 (100%)	55 (100%)	100
	$X^2 = .378$; DF = 1		
	$P > .05$		

TABLE VIII

RELATIONSHIP BETWEEN SEX AND ATTITUDES TOWARD DENTAL CARE: CLINIC ADOLESCENTS

Attitude Rating	Sex		Total
	Male	Female	
High	7 (35%)	9 (47.4%)	16
Low	13 (65%)	10 (42.6%)	23
Total	20 (100%)	19 (100%)	39
	$X^2 = .208$; DF = 1		
	$P > .05$ (one-tailed test)		

While no significant difference was discovered between the attitudes of males and females in the clinic sample, the opposite was found for the non-clinic sample. Table IX shows that 64 per cent of the females in this group were rated high scorers compared with 43 per cent of the males. On the other hand, 57 per cent of the males compared with 36 per cent of the females were rated low scorers. When the observed differences between the proportions of males and females rated "high" and "low" in terms of attitudes toward dental care were tested, the differences were found to be statistically significant at the .05 level of significance.

TABLE IX

RELATIONSHIP BETWEEN SEX AND ATTITUDES TOWARD DENTAL CARE: NON-CLINIC ADOLESCENTS

Attitude Rating	Sex		Total
	Male	Female	
High	28 (43%)	48 (64%)	76 (54.2)
Low	37 (57%)	27 (36%)	64 (45.8)
Total	65 (100%)	75 (100%)	140
	$X^2 = 4.78$; DF = 1		
	$P < .05$		

The direction of the association between sex and attitudes toward dental care, is, as was expected among the non-clinic group: females more than males tend to be favourably predisposed to seeking regular dental care. This finding contradicts the one of no difference between the sexes found for the clinic patients; but it is supported by other studies.[79] Freidson found among other things, that belief in the value of regular visits to the dentist varies with sex, and that a greater proportion of women than men felt that a person should see the dentist regularly "when his teeth are all right."

TABLE X

RELATIONSHIP BETWEEN INCOME LEVEL AND ATTITUDES TOWARD DENTAL CARE

Attitude Rating	Clinic Group			Non-Clinic Group		
	Income Level			Income Level		
	Below $5000	Over $5000	Total	Below $5000	Over $5000	Total
High	25(38.5%)	15(42.9%)	40	23(41.1%)	53(60%)	76
Low	40(61.5%)	20(57.1%)	60	33(58.9%)	31 (40%)	64
Total	65 (100%)	35 (100%)	100	56 (100%)	84 (100%)	140
	$X^2 = 1.098$; DF=1			$X^2 = 5.01$; DF = 1		
	$P > .05$			$P < .05$ (one-tailed test)		

Table X presents the distribution by number and percentage of persons in both the Clinic and non-clinic groups by

[79] Freidson, Eliot and Feldman, Jacob, J., loc. cit.

income level and attitude ratings. With regard to the clinic group, 65 per cent of the patients reported family incomes below $5000 per year, and 35 per cent of them reported incomes of $5000 and over. 38.5 per cent of the under $5000 income group obtained high attitude scores, while 61.5 per cent of the group obtained low scores. In the "$5000 and over" income group 42.9 per cent and 57.1 per cent respectively, received high and low scores. The observed variations in attitude ratings of the income groups would seem to suggest that income level and attitudes are related; but the test of association proved otherwise. As shown in Table X, there is no significant difference between the attitudes toward dental care of the two income groups: more than one-half of the persons in each of the income groups appear to place a relatively low value on regular periodic dental care.

However, for the non-clinic group, Table X establishes a definite association between level of income and attitudes toward dental care. A noticeably higher percentage of persons from the higher income group (60 per cent) was predisposed to visit the dentist on a regular basis than the percentage in the lower income group (40 per cent). The test of association revealed that the difference between the percentages of persons from the two income groups with favourable attitudes towards dental care was statistically significant at the .05 level of significance. In addition, the two variables, attitude and income, were found to be positively associated, in

that a higher proportion of persons in the "5000 and over" income group showed a greater tendency to be favourably predisposed toward seeking regular dental care.

Previous studies support this finding of a positive association between income level and attitudes toward dental care. Reports from one of these studies show that the general attitude of the lower income groups is that one can get along without the dentist unless there is a tooth to be extracted.[80] Freidson shows also that belief in the value of regular visits to the dentist varies with income: more people in the higher income groups than in the lower income groups believe in the value of regular visits.[81] The fact that attitudes toward dental care were found to be unrelated to income level with respect to the clinic sample studied raises many questions. Is income, as such, the important factor, or is it the interaction between income and such other factors as education, information about what constitutes good dental health practice, the competing demands for other services which conditions attitudes toward dental care? All these factors may be of varying importance; but the fact that the cost of dental services at the Dental School Clinic is the same for all the recipients of dental care, and as demonstrated in Table V 40 per cent of the patients there have a favourable attitude toward dental care as compared with 54.3 per cent of the non-

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[80]Koos, Earl Lomon, loc. cit.

[81]Freidson E., and Feldman, J., loc. cit.

clinic subjects, the predisposition to visit the dentist on a regular basis seems to be related to some other uncontrolled variable which mediates between income or ability to pay and attitudes toward dental care.

Hypothesis 5: The higher the level of education the more positive is the attitude toward dental care.

TABLE XI

RELATIONSHIP BETWEEN LEVEL OF EDUCATION AND ATTITUDES TOWARD DENTAL CARE (CLINIC GROUP)

Attitude Rating	Level of Education			
	Less than Gr. 9	Gr. 9-11	Over Gr. 12	Total
High	12 (26.7%)	21 (48.4%)	7 (58.3%)	40
Low	33 (73.3%)	22 (51.6%)	5 (41.7%)	60
Total	45 (100%)	43 (100%)	12 (100%)	100

$X^2 = 5.95$; DF = 2

$P < .05$ (one-tailed test)

An examination of Table XI shows that as the level of education increases, so does the proportion of persons at each level of education who had high attitude ratings. The most striking difference in attitudes can be seen between the lowest and the highest educational groups. There are twice as many persons with a high attitude rating in the group

with "twelve or more years" of schooling as there are in the group with "less than nine years" of schooling. In other words, while 58.3 per cent of those persons with twelve or more years of schooling reported that they were favourably predisposed toward seeing the dentist on a regular basis, less than 27 per cent of those persons with less than nine years of schooling were so predisposed. And the percentage variation between the lowest and the intermediate groups is approximately the same as the percentage variation between the intermediate and the highest group. Looked at from the standpoint of unfavourable attitude toward dental care, Table XI shows a similar association between the variables under study. As the level of education increases there is a corresponding decrease in the proportion of persons with an unfavourable attitude toward dental care: over 73 per cent of the population with "less than nine years" of schooling has a low attitude rating compared with 41.7 per cent of those persons with "twelve or more years" of schooling.

When these observed differences were submitted to the test of association, the association between level of education, proved to be statistically significant at the .05 level.

Although the literature reviewed made references to attitudes toward dental care, the references were mostly concerned with patterns of utilisation rather than the predisposition to utilize dental services. Therefore attitudes toward dental care were inferred from the actual frequency of visits,

which was then correlated with the socioeconomic variables of income, education and occupation. Since the present study adopted a different approach and attempted to study the psychological orientation preceding dental behaviour corroborating evidence of an entirely parallel kind is difficult to find. Nevertheless, those studies[82, 83] which have inferred attitudes toward dental care from frequency of visits and last previous visit, suggest that the predisposition to seek dental care is positively related to educational level.

Demand For, and Utilisation of, Dental Care

Hypothesis 6: The demand for dental care is greater among Clinic patients than among non-clinic patients.

In order to test this hypothesis two measures of demand were applied: (i) the length of time since the last previous visit and, (ii) the frequency of visits to the dentist. Each of these measures of demand, it was felt, would serve to complement the other since previous studies have shown that length of time since last visit, taken by itself, "is not an accurate measure of regularity of attendance at the dentist."[84] While most of those patients who had visited a dentist within the last six months might have been following this practice

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[82]Freidson, Eliot and Feldman, Jacob J., Ibid., p. 330.

[83]Kriesberg, L. and Trieman, B. R., op. cit., p. 148.

[84]U. S. Bureau of Economic Research and Statistics, op. cit., p. 145.

from an early age, it seemed reasonable to assume that there were some patients who had only recently started the practice. In fact, during the review of the records of those patients attending the Dental School Clinic, it was discovered that many of the patients, although visiting the Clinic less than six months ago, had not visited any dentist on a regular basis, prior to their being accepted as patients at the Clinic.

TABLE XII

RELATIONSHIP BETWEEN SOURCE OF DENTAL CARE AND LAST PREVIOUS VISIT TO A DENTIST (ALL AGE GROUPS COMBINED)

Time Elapsing Since Last Previous Visit	Source of Dental Care					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
Less than 6 mos. ago	71	(71)	72	(51.4)	143	(59.5)
6-11 mos. ago	16	(16)	23	(16.4)	39	(16.3)
1-2 years ago	6	(6)	29	(20.7)	35	(14.6)
Over 2 yrs. ago	7	(7)	14	(10.0)	21	(8.8)
Never	0	(--)	2	(1.4)	2	(0.8)
Total	100	(100)	140	(100)	240	(100)

$X^2 = 14.09$; DF = 4

$P < .05$ (one-tailed test)

The analysis shown in Table XII has some interesting results. When the two samples are combined, nearly 60 per cent of the patients are seen to have visited a dentist less than

six months ago. For the Clinic group, 71 per cent of its population had seen a dentist less than six months previously while in the non-clinic group just over 50 per cent (51.4%) of the group had visited a dentist less than six months previously. However the proportion of persons, in both groups, who had seen a dentist between "6 months and 11 months" ago were approximately the same for the combined populations as for the individual groups. In the case of those persons who had not seen a dentist in less than one year, the clinic group accounted for 13 per cent, while for the non-clinic group, nearly 28 per cent had not visited within the previous year. Included in the latter group are two persons (1.4 per centof the non-clinic population) who had never visited a dentist.

Despite the similarity in the percentages of persons who last saw a dentist between "6 and 11 months' previously, the over-all proportional differences between the groups proved to be statistically significant below the.05 level. Furthermore, the direction of the relationship is in favour of the Dental School Clinic: that is, the evidence indicates that users of the Clinic's services are more likely to have visited the dentist less than 6 months previously than non-clinic users.

The findings presented in Table XII lead to the conclusion that the demand for dental care, measured by the length of time elapsing since the last previous visit to a dentist, is greater among the Clinic patients than non-clinic patients. Since the two groups were not comparable in terms

TABLE XIIA

RELATIONSHIP BETWEEN SOURCE OF DENTAL CARE AND LAST PREVIOUS VISIT TO A DENTIST (ADOLESCENTS)

Time Elapsing Since Last Previous Visit	Source of Dental Care					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
Less than 6 months ago	29	(74.3)	72	(51.4)	101	(56.4)
6-11 mos. ago	5	(12.8)	23	(16.4)	28	(15.6)
1 - 2 yrs. ago	2	(5.1)	29	(20.7)	31	(16.8)
Over 2 yrs. ago	3	(7.8)	*16	(11.4)	19	(11.2)
Total	39	(100)	140	(100)	179	(100)

$X^2 = 7.86$; DF=3

$P < .05$ (one-tailed test)

* Includes 2 persons who had never visited a dentist.

of age it was decided to hold the age groups constant and submit them to the test of association. Table XIIA demonstrates that even with the controlling of age, the difference in demand for dental care between the Clinic and non-clinic patients is statistically significant. And the direction of the association is the same as that obtained in Table XII: a greater percentage of the Dental School Clinic patients than the non-clinic patients had visited the dentist less than 6 months previously. Over 87 per cent of the users of the Clinic's dental services had visited the dentist within less than one year, while for the same period just over 67 per cent of the non-clinic group had done so.

In view of the earlier observation concerning the inaccuracy of last previous visit to the dentist as a measure of demand for dental care, the conclusion that clinic patients visit the dentist more frequently than the non-clinic patients will be accepted only tentatively until the other measure of demand has been applied to the samples. This is done in Tables XIIB and XIIC below.

TABLE XIIB

RELATIONSHIP BETWEEN FREQUENCY OF VISITS TO THE DENTIST AND SOURCE OF DENTAL CARE

Frequency of Visits	Source of Dental Care					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
Less than 6 mos.	24	(24)	40	(28.6)	64	(26.7)
6-11 mos.	15	(15)	41	(29.3)	56	(23.3)
1-2 years	9	(9)	16	(11.4)	25	(10.4)
Over 2 years	4	(4)	5	(3.6)	9	(3.7)
When something is wrong	48	(48)	38	(27.1)	86	(35.9)
Total	100	(100)	140	(100)	240	(100)

$X^2 = 12.71$; DF = 4

$P < .05$; (one-tailed test)

The data in Table XIIB represent the reported practice of periodic visits to the dentist. It can be seen that 50 per cent of the combined samples visit the dentist on a regular basis at least once a year, while 35 per cent of them

visit only when dental work is needed. The remainder of the subjects visit the dentist any time between one year and over two years. Of the 50 per cent of the entire population who reported that they habitually visit the dentist at least once a year, 39 per cent are patients at the Dental School clinic, and 59.9 per cent receive their dental care from other sources. On the other hand, 48 per cent of patients of the Clinic reported that prior to their being accepted there, their practice was to visit a dentist only "when something is wrong." Among the non-clinic recipients of dental care slightly more than 27 per cent reported going to the dentist only "when something is wrong."

The fact that the separate group percentages are markedly different from those of the combined groups suggests that frequency of visits to the dentist and source of dental care are associated. The test of significance proved that the two variables are statistically significant at the .05 level of significance, and Table XIIB further demonstrates that the direction of the relationship is in favour of the non-clinic recipients of dental care. It seems reasonable, therefore, to conclude that the non-clinic recipients of dental care habitually visit the dentist more frequently than users of the Clinic. In other words, the demand for regular periodic dental care is greater for the non-clinic users than for the Clinic patients. The apparent greater demand for dental care shown for the latter group by the index of length of time

since the last visit to a dentist appears to be superficial when compared with over-all frequency of visits; that is, when past and present practices are considered.

TABLE XIIC

RELATIONSHIP BETWEEN SOURCE OF DENTAL CARE AND FREQUENCY OF VISITS (ADOLESCENTS)

Frequency of Visits	Source of Dental Care					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
Less than 6 months	11	(28.2)	40	(28.6)	51	(28.5)
6 - 11 months	7	(18.2)	41	(29.3)	48	(26.8)
1-2 years	4	(10.2)	16	(11.4)	18	(10.1)
Over 2 years	4	(10.2)	5	(3.6)	11	(6.1)
When something is wrong	13	(33.3)	38	(27.1)	51	(28.5)
Total	39	(100)	140	(100)	179	(100)

$X^2 = 9.12$; DF = 4

$P < .05$ (one-tailed test)

In order to eliminate any effect which the variation in ages between the two groups might have caused, age was held constant for both groups. Table XIIC shows the percentage frequencies of visits for two groups of adolescents who receive dental care from different sources. It will be seen that, whereas 46.4 per cent of the adolescents from the Clinic sample visit the dentist regularly at intervals of less than one year, 57.9 per cent of the non-Clinic adolescents make regular visits

for the same period. The interval designated "when something is wrong" is perhaps the best index for assessing the type of dental care sought, whether preventive or curative. When it is combined with the "2 years and over" interval Table XIIC demonstrates that while nearly 49 per cent (48.6 per cent) of the Clinic's patients visit the dentist for curative treatment, just over 30 per cent (30.7%) of the non-Clinic users visit the dentist for the same reason. The percentage variations in the frequency of visits between the two groups clearly demonstrates, therefore, the existence of an association between frequency of visits and source of dental care.

Not only is there an association, but it is statistically significant at the .05 level; the direction of the association is, again, in favour of the non-Clinic patients: more than 95 per cent of the time there is the likelihood that a greater percentage of the non-Clinic than Clinic users will visit the dentist at intervals of less than one year. On the other hand, a greater percentage of Clinic than non-Clinic users will visit the dentist at intervals of two years and over, and for curative rather than preventive care.

Hypothesis 7: The demand for dental care is greater among females than among males.

For the analysis of the relationship between sex and the demand for dental care it was found necessary to reduce the number of intervals with respect to frequency of visits to

the dentist. Persons visiting the dentist at intervals of "less than 6 months" and between "6 months and less than one year" were grouped together under the category "less than 1 year"; those who had reported visiting only "when something is wrong" were grouped together, and all other respondents were put into the "over 1 year" category. Table XIII presents the percentage distribution of males and females by frequency of visits and source of dental care.

TABLE XIII

RELATIONSHIP BETWEEN SEX AND DEMAND FOR DENTAL CARE

Frequency of Visits to the Dentist	Clinic Group			Non-Clinic Group		
	Sex			Sex		
	Male	Female	Total	Male	Female	Total
	No. %	No. %		No. %	No. %	
Less than 1 year	20 (46.4)	19 (34.5)	39	33 (50.8)	48 (64)	81
Over 1 year	6 (13.3)	7 (12.7)	13	12 (18.4)	9 (12)	21
When something is wrong	19 (42.3)	29 (52.8)	48	20 (30.9)	18 (24)	38
Total	45 (100)	55 (100)	100	65 (100)	75 (100)	140
$X^2 = 1.197$; DF = 2				$X^2 = 4.61$; DF = 2		
$P > .05$ (one-tailed test)				$P < .05$ (one-tailed test		

In the Clinic sample the percentage of persons in each sex category visiting the dentist at regular intervals of less than one year is less than for the non-Clinic sample. But there is the tendency for a greater percentage of males than females from the Clinic to visit the dentist at regular intervals of less than one year. While 46.4 per cent of the males reported that they habitually visited the dentist in less than one year, 34.5 per cent of the females reported that frequency. And among the category of Clinic patients who normally visited a dentist only "when something is wrong", 52.8 per cent were females compared with 42.3 per cent of the males.

Notwithstanding this observed difference in the habitual visiting patterns of males and females from the Clinic sample, the test of significance of the association between sex and demand for dental care established no statistical significance between the observed percentage variations. It can be concluded therefore, that there is no significant difference in the demand for dental care among males and females of the Clinic group.

The situation is different for the non-Clinic group. While 50.8 per cent of the males in this group see a dentist at regular intervals of less than one year, 64 per cent of the females do so. Males more than females tend to visit the dentist only for corrective treatment as shown in Table XIII; 30 per cent of the non-Clinic males reported that they usually visit the dentist when something is wrong with their teeth,

as compared with 24 per cent of the females, who visit at this time.

This apparent association between frequency of visits to the dentist and sex was found to be significant when the percentage differences were submitted to the test of significance. Table XIII above, shows that there is a statistically significant difference between the proportions of males and females visiting the dentist at specified intervals. Females more than males tend to visit the dentist regularly: and also, females are more likely to seek preventive dental care than males, while more males than females tend to seek corrective care.

The present finding that females visit the dentist more often than males is supported by other studies already cited. One of these found that while less than 50 per cent of the population visit a dentist at least once a year, of those who did so there were twice as many females as males.[85] Also, Canadian Sickness Survey indicated that 60 per cent of the persons visiting dentists are women.[86] But in addition to supporting these findings the present study has directed attention to the fact that women not only visit the dentist more often than men, but they show a greater interest in preventive treatment than do men.

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[85]Anderson, Odin W., and Feldman, J. J., loc. cit.

[86]Department of National Health and Welfare and Dominion Bureau of Statistics, loc. cit.

With respect to the Clinic patients for whom no significant difference in utilisation patterns were found, for the sexes, a possible explanation appears to underlie the fact that they visit the dentist at the intervals recommended by the Clinic. Non-clinic recipients of dental care, on the other hand, visit the dentist on a voluntary basis. This means that once a person has been registered as a patient at the Clinic he normally makes a visit at such times as he is invited to appear for treatment.

Hypothesis 8: Demand for dental care is greater among individuals in the higher income groups than in the lower income groups.

TABLE XIV

RELATIONSHIP BETWEEN INCOME AND DEMAND FOR DENTAL CARE

Frequency of Visits	Clinic			Non-Clinic		
	Income Group			Income Group		
	Under $5000	Over $5000	Total	Under $5000	Over $5000	Total
	No. %	No. %	No.	No. %	No. %	No. %
Less than 1 year	19 (29.2)	20 (57.1)	39	24 (42.8)	57 (68)	81 (81)
Over 1 year	12 (18.5)	1 (2.9)	13	10 (17.9)	11 (13)	21 (15)
When something is wrong	32 (52.3)	14 (40)	48	22 (39.3)	16 (19)	38 (27)
Total	65 (100)	35 (100)	100	56 (100)	84 (100)	140 (100)
$X^2 = 9.70$; DF = 2 $P < .05$ (one-tailed test)				$X^2 = 9.28$; DF = 2 $P < .05$ (one-tailed test)		

As shown in Table XIV, 65 per cent of the Clinic sample falls within the income-group of "less than $5000 per annum", while 35 per cent falls within the "$5000 and over" income group. Of the 39 per cent of the clinic sample who reported that they visit the dentist at intervals of less than 1 year, 29.2 per cent belongs to the lower income group and 57.1 per cent belongs to the higher income group. Conversely, of the 48 per cent of the population going to a dentist only "when something is wrong", 52.3 per cent belong to the category of persons with incomes of less than $5000 per year as compared with 40 per cent of the "$5000 and over" category.

These observed differences between the proportions of persons at the two income levels visiting the dentist at the specified intervals are so striking that it is unlikely they are merely the result of sampling fluctuations. When they were submitted to the test of significance the percentage variations proved to be statistically significant at the .05 level of significance. From this result the conclusion may be drawn that income is undoubtedly a factor influencing the frequency with which the different categories of clinic patients studied visit the dentist. Moreover, the percentages in Table XIV demonstrate a positive association between the two variables; that is, frequency of visits to the dentist tends to increase as the level of income increases.

The pattern of demand for dental care in the non-clinic

sample is similar to that shown for the Clinic sample. Of the 58 per cent of the persons in the non-Clinic group who visited a dentist at regular invervals of under 1 year, 42.8 per cent have incomes below $5000 per annum, and 68 per cent have incomes above $5000 per annum, and, conversely, within the category of persons going to a dentist only "when something is wrong", 39.3 per cent belong to the under $5000 income-group, while 19 per cent belong to the $5000 and over income group. As with the Clinic sample, these observed percentage differences between the income groups were found to be statistically significant at the .05 level. Furthermore, the direction of the association between income and frequency of visits to a dentist is in favour of the higher income group: a larger proportion of persons in the "$5000 and over" income group tends to visit the dentist at regular intervals of less than 1 year, and a smaller proportion tends to visit "when something is wrong." On the other hand, more than twice as many persons in the lower income group (39.3 per cent) as in the higher income group (19 per cent) visit the dentist only when something is wrong. It should be borne in mind that the latter index of demand directs attention to the type of dental care usually sought by the income groups, whether or not care is preventive or curative.

This analysis of the association between income and the demand for dental care leads to the conclusion, therefore, that the demand for dental care is significantly associated

with the level of income and that as income increases there is a corresponding increase in the frequency with which people visit the dentist. This pattern of demand is shown for both the Clinic and the non-clinic recipients of dental care, although the percentage of persons in each of these groups vary with respect to frequency of visits: more of the non-clinic patients visit a dentist at shorter intervals than the Clinic patients.

Various studies[87, 88, 89] in this field have arrived at similar conclusions concerning the association between income and frequency of visits to the dentist. Weeks and his colleagues have indicated though, that the greater neglect of dental and medical needs found among the lower income families in their study "could frequently be traced back to fear of treatment rather than amount of income".[90] Until there is evidence to support this hypothesis the finding of the present study will be regarded as valid.

Hypothesis 9: A greater proportion of persons in the higher educational categories are likely to demand regular dental care than persons in the lower educational categories.

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[87] The Canadian Sickness Survey, loc. cit.

[88] Kriesberg, Louis and Freidman, B. R., loc. cit.

[89] U. S. Health Survey, loc. cit.

[90] Weeks, Ashley, et. al., loc. cit.

TABLE XV

RELATIONSHIP BETWEEN FREQUENCY OF VISITS TO THE DENTIST AND LEVEL OF EDUCATION (CLINIC GROUP)

Frequency of Visits	Level of Education							
	Less than Gr. 9		Gr. 9-11		Gr. 12 and over		Total	
	No.	%	No.	%	No.	%	No.	%
Less than 1 year	12	(26.7)	20	(46.5)	7	(58.5)	39	(39)
When something is wrong	33	(73.3)	23	(53.5)	5	(41.5)	61	(61)
Total	45	(100)	43	(100)	12	(100)	100	(100)

$X^2 = 5.77$; DF = 2

$P < .05$ (one-tailed test)

In the preceding analysis of demand for dental care, the variable frequency of visits was classified into three intervals. For the present analysis, shown in Table XV, it became necessary to reduce the number of classifications to two, intervals of "less than 1 year" and "when something is wrong", in order to have frequencies large enough from which the expected values could be computed.

Table XV shows that less than one-half (39 per cent) of the persons in this sample visit a dentist at regular intervals of less than 1 year, while 61 per cent of the persons visit only "when something is wrong". There is a

noticeable difference, however, between the proportion of people at each level of education who visit the dentist at the specified intervals. While 26.7 per cent of the people with "less than a Grade 9" education visit a dentist at intervals of less than 1 year, 46.5 per cent of those in "Grades 9 to 11" visit at intervals of less than 1 year, and 58.8 per cent of those with "Grade 12 and over" visit the dentist at intervals of less than 1 year. Conversely, as the level of education increases the percentages visiting a dentist only when something is wrong decreases. As can be seen in the Table, 73.3 per cent of the persons with less than a Grade 9 education visit the dentist only when something is wrong; 53.5 per cent of those in the Grades 9 to 11 category visit at that time, while 41.5 per cent of the persons who have "12 or more years" of education visit only when something is wrong.

The test of association between frequency of visit to the dentist and level of education proved to be statistically significant at the .05 level, and Table XV demonstrates that the association between level of education and demand for dental care is a positive one; that is, at the higher levels of education a larger proportion of persons visited the dentist on a regular basis than at the lower levels of education. In addition, while at the higher levels of education people go to the dentist "preventively", corrective dental treatment is evidently the major reason for people at the lower levels of education to visit the dentist.

Of course, this finding is not a new one, for previous studies have made similar discoveries. Kriesberg,[91] for example, found that education and income, whether taken together or separately, are significantly associated both with going to the dentist preventively and with not going to the dentist even when dental work is needed.

Some Other Variables Associated With Attitudes Toward, and Demand for Dental Care

The preceding analyses have found so far that education and income, as well as sex, are significantly associated with attitudes toward, and demand for dental care. However, unlike most of the other studies concerned with dental care, the present study found no significant association between age and attitudes toward dental care. On the other hand, it was found that age at first visit to the dentist, occupation, and fear of pain are significantly related to attitudes toward dental care. The data on each of these variables will be presented below.

Table XVI shows for the clinic sample that 62.5 per cent of those persons who made their first visit to a dentist before the age of 8 years old obtained high scores on the attitude scale compared with 19.2 per cent of the group that made their first visit at age 14 years or older. Of those who made their first visit between 8 and 13 years old, 33.3 per cent rated high on the scale, and twice as many persons

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[91]Kriesberg, L. and Freiman B. R., loc. cit.

TABLE XVI

RELATIONSHIP BETWEEN AGE OF FIRST VISIT TO THE DENTIST AND ATTITUDES TOWARD DENTAL CARE (CLINIC GROUP)

Attitude Rating	Age at First Visit							
	Younger than 8 years old		8-13 years		14 years and over		Total	
	No.	%	No.	%	No.	%	No.	%
High	22	(62.5)	13	(33.3)	5	(19.2)	40	(40)
Low	13	(37.5)	26	(66.7)	21	(80.8)	60	(60)
Total	35	(100)	39	(100)	26	(100)	100	(100)

$X^2 = 12.94$; DF = 2

$P < .05$ (one-tailed test)

in the "14 and over" group (80.8 per cent) as compared to 37.5 per cent in the "under 8 years" group were rated low scorers, while 66.7 per cent of the intermediate group obtained low attitude ratings. The variations between the percentage of persons rated high and low in each of the groups show an inverse relationship between age of first visit to the dentist and attitudes toward dental care.

The results of the test of significance show that attitudes toward dental care are positively associated with age of first visit to the dentist. In other words, those persons who in early childhood, were exposed to the practice of regular visits to the dentist are more likely to view dental care as a necessity than persons who made their first visit at a later age.

TABLE XVIA

RELATIONSHIP BETWEEN AGE OF FIRST VISIT TO THE DENTIST AND ATTITUDES TOWARD DENTAL CARE (NON-CLINIC GROUP)

/Attitude Rating	Age at First Visit to the Dentist							
	Younger than 8 years old		8 - 13 years		14 years and over		Total	
	No.	%	No.	%	No.	%	No.	%
High	61	(58.7)	10	(58.8)	5	(36.4)	76	(54.3)
Low	43	(41.3)	7	(41.2)	14	(63.6)	64	(45.7)
Total	104	(100)	17	(100)	19	(100)	140	(100)

$X^2 = 6.41$; DF = 2

$P < .05$ (one-tailed test)

The data in Table XVIA lead to some interesting conclusions. Firstly, there seems to be no difference between the attitudes of those who made their first visit to a dentist before the age of 8 years old and those who made their first visit between the ages of 8 and 13 years old. The percentage difference between these groups in respect of high and low attitude ratings is so small that it may be ignored. Nevertheless, when those groups are compared with the "14 and older" group the differences become substantial. Table XVIA shows that 36.4 per cent of those who made their first visit to the dentist at the age of "14 years or older" obtained high attitude ratings while approximately 59 per cent of the other

groups were so rated. It can be seen also, that nearly 64 per cent of the persons in "the 14 and older" group manifested low or negative attitudes toward dental care compared with slightly more than 41 per cent of the other groups. It is apparent, therefore, that age at first visit to the dentist only becomes important before the age of 14 years old; presumably, because very young children have no attitudes of their own. In a reference to the attitudes of children toward health and illness Lamb[92] made the observation that young children have no attitudes of their own, but they adopt those of their parents.

The conclusion to be drawn here, though, rests on the data presented in Table XVIA. The test of association between age at first visit to the dentist and attitudes toward dental care resulted in a positive significant association between the two variables. In the circumstances, it is reasonable to conclude that those persons exposed to early dental care habits tend to be more favourably predisposed to seeking regular dental care than persons who made their first visit to the dentist beyond the age of 14 years old.

When a comparison is made between the attitude ratings of the Clinic patients (Table XVI) and the non-clinic patients (Table XVIA) small differences can be seen between

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[92] Lamb, Sylvia and Solomon, David N. op. cit. p. 39.

the proportions of persons in each group with specified attitude ratings. Whereas among the non-clinic group 58.8 per cent of the patients who made their first visit to a dentist at the age "between 8 and 13 years old" are rated high on the attitude scale, the corresponding category in the Clinic group accounts for less than 34 per cent. There is, also, a higher percentage of low scorers in the Clinic group than in the non-clinic group; but the general pattern between age at first visit and attitude rating is much the same for the two groups. It is not necessary therefore to alter the conclusion which was arrived at earlier, namely: age at first visit to a dentist is inversely related to attitudes toward dental care.

No hypothesis had been formulated concerning the relationship between occupation and attitudes toward dental care; but during the analysis of the variables for which there were hypotheses it became apparent that a person's occupation affected his attitude toward dental care: persons with similar occupations tended to obtain similar attitude ratings. In order to trace any association which might exist between the two variables the respondents' source of dental care was held constant.

The occupational category designated "professional" includes those persons holding managerial positions, while the category "other" includes those persons who could not be classified with the other three occupational categories specified.

TABLE XVII

RELATIONSHIP BETWEEN OCCUPATION AND ATTITUDES TOWARD DENTAL CARE (CLINIC SAMPLE)

Attitude Rating	Occupational Category									
	Professional		Clerical and Sales		Manual		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
High	12	(63.2)	11	(57.9)	12	(22.6)	5	(55.6)	40	
Low	7	(36.8)	8	(42.1)	41	(77.4)	4	(44.4)	60	
Total	19	(100)	19	(100)	53	(100)	9	(100)	100	

$X^2 = 8.04$; DF = 3

$P < .05$ (one-tailed test)

As can be seen in Table XVII, there is no great difference between the proportions of persons rated high scorers under "professional", and "sales and clerical." However, the difference becomes pronounced when those occupational categories are compared with the category designated "manual." It will be seen that more than twice as many persons in the manual group as in the preceding groups were rated low scorers on the attitude scale. Similarly, the number of high scorers in professional and clerical groups were more than twice the number in the manual group. These percentage differences in attitude ratings when submitted to the test of significance proved to be significant at the .05 level. It can be stated, therefore, that there is a significant positive association

between occupation and attitudes toward dental care: that is, persons engaged in non-manual occupations indicate a greater tendency toward seeking regular periodic dental care than persons engaged in manual jobs.

Other studies have found a similar association between occupation and belief in regular dental care. In addition, Freidson found that the association held for the job incumbent as well as his dependents. The present study, nevertheless, found no association between the occupation of the family-head and the attitudes of adolescents toward dental care. Table XVIII presents the comparison between "father's occupation" and attitudes of adolescents toward dental care.

The numbers from which the percentages in the Clinic have been calculated, are small, and for this reason the results might not be altogether reliable. Furthermore, the original four occupational categories had to be reduced to two, "manual" and "non-manual" in order to obtain frequencies large enough from which the expected values could be calculated. As Table XVIII shows, no significant association was established between father's occupation and attitudes toward dental care.

The numbers from which the percentages in the non-clinic group have been calculated are substantially larger than those from the Clinic group, and might therefore be more reliable. But here the percentage variations between the attitude ratings of the occupational categories in the group are on the whole, not very large. One noticeable large difference

TABLE XVIII

RELATIONSHIP BETWEEN FATHER'S OCCUPATION AND ATTITUDES TOWARD DENTAL CARE

(ADOLESCENTS)

Attitude Rating	CLINIC										NON-CLINIC									
	Father's Occupation										Father's Occupation									
	Professional		Sales & Clerical		Manual		Other		Total		Professional		Sales & Clerical		Manual		Other		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
High	4	(50)	2	(25)	7	(36)	2	(40)	15		22	(57)	10	(59)	29	(46)	15	(65)	76	
Low	4	(50)	6	(75)	11	(63)	3	(60)	24		16	(42)	7	(41)	33	(53)	8	(34)	64	
Total	8		8		18		5		39		38		17		62		23		140	

$X^2 = 0.79$; DF = 3

$P > .05$ (one-tailed test)

$X^2 = 2.91$; DF = 3

$P > .05$ (one-tailed test)

is found within the category designated "other", where the percentage of high scorers is nearly twice as large as the percentage of low scorers. The test of significance showed, however, that there is no significant relationship between father's occupation and attitudes toward dental care.

The final analysis is concerned with tracing the influence of one emotional factor which has been said to prevent people from seeking preventive dental care. Table XIX presents an analysis of the extent to which fear of pain and the dentist keeps people from seeking the dental attention they think or know they need.

TABLE XIX

RELATIONSHIP BETWEEN SOURCE OF DENTAL CARE AND EXTENT TO WHICH FEAR OF PAIN PREVENTS PEOPLE FROM SEEKING DENTAL WORK NEEDED

Extent to Which Fear of Pain Prevents People From Seeking Dental Attention They Need	Source of Treatment					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
Most of the time	13	(13)	21	(15)	34	(14)
Sometimes	12	(12)	37	(26.4)	49	(20)
Hardly Ever	75	(75)	82	(58.6)	159	(66)
Total	100	(100)	140	(100)	240	(100)

$X^2 = 8.33$; DF = 2

$P < .05$ (one-tailed test)

Table XIX shows that approximately the same percentage of persons in the Clinic group as in the non-Clinic group neglect seeing a dentist on a regular basis because they fear the pain dentists are thought to inflict. By combining categories one and two, however, it is noticed that more than one and a half times as many of the non-clinic patients (41.4 per cent) as Clinic patients (25 per cent) neglect regular dental care as a result of fear. And while 75 per cent of the Clinic patients "hardly ever" postpone their visits because of fear, 58.6 per cent of the non-clinic patients reported that they hardly ever neglect seeing the dentist for that reason. But on the whole, fear of the dentist does not appear to be a major deterrent for not visiting the dentist.

But despite superficial impressions the test proved that there is a significant relationship between source of dental treatment and the extent to which fear of pain prevents people from making regular visits to the dentist. The direction of the relationship is in favour of the Dental School Clinic, in that, a greater percentage of those persons receiving dental care from that source are less likely to postpone their visits because of fear of pain inflicted by the dentists.

This finding in no way indicates that the non-clinic recipients of dental care more than the Clinic patients postpone regular visits to the dentist, for the data in Table XIIB

have demonstrated that a higher percentage of the non-clinic users than Clinic patients visit the dentist at regular intervals of less than one year. The conclusion to be drawn from Table XIX is that the Clinic patients do not neglect regular dental care so much because of fear of dentists, but possibly because of such other factors as variations in levels of education, amount of disposable income, age at first dental visit and difference in occupational roles. If, therefore, the Dental School Clinic can equalize or lessen the socio-economic differences between Clinic and non-clinic patients, both the tendency toward, and the demand for, preventive dental care are likely to be more favourable for Clinic patients than for non-clinic patients.

Supply of Dentists' Services

Hypothesis 10: The demand for dental care is greater than the dental manpower available to meet that demand.

For the purposes of this study dental manpower or the supply of dentists' services will refer to the number of patient-visits each dentist was able to accommodate in his practice during 1965; that is, the mean number of visits per patient times the total number of patients for whom dentists could provide dental care during the period under consideration. Demand for dental care, on the other hand, refers to the total number of patient-visits received by all the dentists; that

is, the total number of patients times the number of visits per patient.

In order to test the hypothesis, mailed questionnaires were sent to a random sample of dentists practising in Metropolitan Winnipeg. Of the 76 dentists (approximately 37 per cent of the dentists listed in the classified section of the telephone directory) 36 (47.4 per cent) returned completed or partially completed questionnaires: 2 dentists could not be located, and 2 others were deceased.

Two of the questions asked for the actual or estimated number of patients and patient-visits the dentists had dealt with during the year 1965; only 14 dentists (18.4 per cent of the sample) provided complete estimates of those figures. Another 11 dentists provided estimates of either the number of patients or the number of patient-visits, but not both; and 11 dentists stated that they could not estimate either. Therefore, the estimates of supply of dentists' services and the demand for those services to be provided by this study will be based mainly on the data supplied by the 14 dentists who provided adequate information.

During 1965 the 14 dentists provided dental care for a total of 16,164 different patients, and these patients made a total of 42,665 visits. In other words, the average dentist treated 1155 different patients, and each patient made an average of two and one-half visits. This means that the patient-visits per dentist was 3048. On the basis of the

foregoing estimates it follows that during 1965 the dentists in Metropolitan Winnipeg provided or were able to provide dental care for a total of 221055 patients and were able to accommodate 618,744 patient-visits.

Estimate of Differential Between Demand for, and Supply of Dentists' Services

The classified section of the telephone directory listed a total of 203 dentists who were engaged in private practice during the period under consideration. In terms of the number of patient-visits accommodated by each of the 14 dentists referred to above, it appears that the demand for dental care had been adequately met, in the sense that the total visits requested were equivalent to what the dentists were able to provide.

In order to investigate further the relation of demand to supply the dentists were asked whether or not their practice could accommodate any new patients. Table XX shows that nearly 64 per cent of the dentists could accommodate new patients; another 31 per cent stated that they could not accommodate new patients; another 5 per cent of the dentists made no reply to the question. It appears, therefore, that some dentists were working at full capacity and so were unable to provide dental care for some persons who sought the service. But in view of the fact that 64 per cent of the dentists reported that their practice could accommodate additional

patients, it is possible, in theory at least, that those persons who had been refused dental care by some dentists could obtain the service from those dentists who were, apparently, working below full capacity. Thus, effective demand for dental care - the amount of dental care people are able and willing to purchase - appears to have been adequately provided for, during 1965.

TABLE XX

DENTISTS ABILITY TO ACCOMMODATE NEW PATIENTS BY TYPE OF PRACTICE

Type of Practice	Ability to Accommodate New Patients							
	Yes	%	No	%	Not Stated	%	Total	
General	22	(61.1)	8	(22.2)	2	(5.6)	32	(88.2)
Specialty	1	(2.8)	3	(8.3)	--	(--)	4	(11.8)
Total	23	(63.9)	11	(30.5)	2	(5.6)	36	(100)

When the question is approached from the standpoint of <u>potential demand</u> -- the amount of dentists' services that would be purchased if everyone above the age of four years old were to visit the dentist -- the picture is different. According to 1961 Census of Canada, Metropolitan Winnipeg had a population of 433,117 persons over the age of three years old. Therefore, if all these persons are taken as potential purchasers of dentists' services, then the supply of dentists required for each person to see the dentist

three times a year would be 318 dentists. If potential purchasers were to see the dentist twice a year, approximately 266 dentists would be required; on the other hand, only one-half that number would be required if patients were to see the dentist once a year. But since dentists recommend regular periodic visits of at least twice a year, we have to conclude, tentatively at least, that the potential demand for dentists' services in Metropolitan Winnipeg during 1965 was greater than the available supply of dentists.

The supply of dentists' services and its relation to demand for dental care can be estimated also in terms of the length of time would-be patients must wait before an appointment can be given for initial examination and operative session. Table XXI presents the reported mean number of days which elapse before patients can be given an appointment.

For the population as a whole, the mean number of days which must elapse before a person can secure an appointment for an initial examination is nine days. In order to obtain an appointment for an operative session the patient must wait nearly twice as long, that is, over sixteen days. A new child patient, however, has to wait for a longer time for both types of appointment, 9.5 and 19 days respectively.

When the supply of dentists' services is considered from the standpoint of the different age-groups, the "40 to 49" and the "50 to 59" groups appear to experience the most pressure for their services. In both groups patients must

wait approximately 22 days for an appointment for an operative session; but a new child patient waits, on the average, 28 days for an appointment for an operative session if he seeks treatment from a dentist in the "50 to 59" age-group. He would be more likely to be given such an appointment within 21 days if he were to go to a dentist in the "40 to 49" age-group.

Except for dentists in the "40 to 49" age-group, who cannot give an appointment before 14 days, dentists in all other age-groups give an initial appointment within 10 days. The period of waiting is even less in case of the "60 and over" group. An appointment for initial examination can be given in 6 days, but the new child patient still has to wait for 10 days. This is approximately the same length of time which dentists in the other age-groups have for a new child patient. For an operative session, the child must wait between 11 and 28 days for an appointment, regardless of the age of the dentist.

An additional measure of the supply of dentists' services employed in assessing the extent to which effective demand was being met is the ability of dentists to accommodate new adult and child patients for treatment. Table XXII shows that over 83 per cent of the dentists were able to accommodate additional adult patients, but about 14 per cent reported that they could not do so. If this sample is reliable then it demonstrates that the demand for dental care from the adult

TABLE XXI

LENGTH OF TIME FOR AN APPOINTMENT: MEAN NUMBER OF DAYS BY AGE OF DENTISTS. METROPOLITAN WINNIPEG

Mean Number of Days	Age of Dentist					
	Under 30	30-39	40-49	50-59	60 and Over	Total
Initial Appointment	8.8	7	13.5	10	6	9.0
Operative Session	12.0	12.5	21.7	22.7	13.0	16.2
Child Patient						
Initial Appointment	9.7	8.6	10.0	9.0	10.0	9.5
Operative Session	10.4	13.7	21.0	28.5	21.0	19.0

population is being met to a greater extent than the demand from the child population. It should be noted also that

TABLE XXII

DENTISTS' ABILITY TO ACCOMMODATE NEW PATIENTS

Ability to Accommodate New Patients	Category of Patient			
	New Child Patient		New Adult Patient	
	No.	%	No.	%
Yes	23	(63.9)	30	(83.4)
No	11	(30.6)	5	(13.9)
Not stated	2	(5.5)	1	(2.7)
Total	36	(100)	36	(100)

nearly one-third of the dentists reported that they either did not admit child patients or were unable to accommodate new ones. A few dentists qualified their answers by saying that new child patients would be admitted if their parents were already patients.

CHAPTER VI

SUMMARY AND DISCUSSION OF FINDINGS

The specific objectives of this study were:

1. To assess the extent and nature of dental health needs of a proportionate random sample of dental patients chosen from the Dental School Clinic at the University of Manitoba and compare the dental needs of that group with those of a group of non-clinic adolescents chosen from three high schools in the Winnipeg school system.

2. To assess the association between the dental health attitudes of the two groups and their demand for professional dental care.

3. To assess the association between demand for dental care and each of the following socio-economic variables: age, sex, level of education, and level of income.

4. To estimate the supply of dentists' services in Metropolitan Winnipeg, in relation to effective and potential demand for those services.

Dental Health Needs

The findings on dental health needs relate to the patients' dental condition at the time of their first visit to the Clinic. Among the 143 patients studied, the most prevalent dental problem discovered was the need for

caries treatment. Nearly 74 per cent of all the patients studied needed treatment for the control of caries, and a slightly higher percentage of the females than the males needed treatment. Within the male group the need was greatest among the "13 to 19" age-group where 82.7 per cent males needed treatment. In the case of the females the need was greatest in the "under 13" age-group, where 93.3 per cent of the females needed treatment. The over-all percentage difference in the need for caries treatment between males and females was found to be not statistically significant.

The next most prevalent dental problem found was periodontal disease at various stages of development. Of the 40 per cent of the patients found to have the disease nearly 45 per cent were females and 55 per cent were males. Taking the population as a whole, the highest percentage of cases was found in the "30 to 39" age-group (91 per cent). The lowest percentage of cases was found among the "under 13" age-group, and at every higher age-group the need increased considerably at first, and then declined after age 39. The formal test of association between sex and the occurrence of periodontal disease established no significant relationship between the two variables.

More than one-third of the population (35.6 per cent) needed treatment for malocclusion. The highest percentage of patients with this need (58 per cent) was found among the "under 13" age-group, and the lowest percentage (7 per cent) was found among the "50 and over" age-group. Although the data showed an excess of males over females needing treatment for malocclusion,

that is, 38 per cent males compared with 32 per cent females, the formal test of association established no significant relationship between sex and the need for orthodontic treatment.

Of the 23 per cent of the population needing some form of prosthodontic treatment, 26 per cent of the cases were found among the females compared with the 20 per cent found among the males. The "50 and over" age-group accounted for the highest percentage of persons (80 per cent) needing prosthodontic treatment, followed by the "40 to 49" age-group with 68 per cent. In each of the first three age-groups -- the pre-adolescents, adolescents, and the "20-29" age-groups -- the need for prosthodontic treatment is relatively low and ranges between 6 per cent among the adolescents, to 9 per cent among the "20 to 29" age-group. As in the case with the dental needs specified above, no significant relationship was found between sex and the need for prosthodontic treatment.

Relative to the other dental needs examined, the prevalence of pulp problems was low, in that no more than 21 per cent of the sample population needed endodontic treatment. Among those patients needing this treatment a slightly higher percentage of males than females were so inflicted; that is, 25 and 19 per cent of the respective sex categories.

The need for oral surgery was highest in the "50 and over" age-group, followed by the "under 13" age-group, where 33.3 per cent and 23 per cent of the patients in the respective age-groups needed this service. For the population as a whole, the need for oral surgery is also relatively low: not more

than 18 per cent of the patients needed this service. But females more than males tended to need oral surgery; that is, 21 per cent of the females compared with under 16 per cent of the males. However, no significant association was established between sex and the need for oral surgery.

Nearly one-third of the patients studied needed crown and/or bridge service. The need was highest (50 per cent) among the "30 to 39" age-group and lowest (4 per cent) among the "under 13" age-group, followed by the "50 and over" group where approximately 27 per cent of the patients needed crown and/or bridge service. As with most of the dental needs discussed above, females accounted for a somewhat higher percentage of the cases needing the specified care.

Attitudes Toward Dental Care

The second objective of the study was concerned with assessing the relationship between dental health attitudes of two groups of persons receiving dental care from different sources - one group from the University Dental School Clinic and the other a non-Clinic group. The comparison was in effect, between persons who have family dentists and those who utilize the Clinic services.

The relevant findings are as follows:

1. There is a significant association between source of dental treatment and predisposition to seek regular periodic dental care. The non-clinic recipients of dental care, 87 per cent of whom have family dentists, indicated that a greater proportion of them than the Clinic patients were favourably predisposed to visit the dentist at regular intervals, and not mainly for toothache relief as in the case of the Clinic patients.

2. No significant association was established between age and attitudes toward dental care, although previous studies had indicated such an association. However, a positive significant association was found between age at first visit to a dentist and present attitudes toward dental care, for Clinic and non-clinic groups alike.

On the basis of this finding at least two observations seem appropriate. Belief in the importance of the teeth and regular professional dental care are best fostered during early childhood. Like other attitudes, attitudes toward dental care when transmitted to the young within the family setting are likely to be continued in later life. Secondly, the ability to afford a family dentist might also influence attitudes toward dental care. Thus, while the data on the two groups studied show that attitudes toward dental care are positively associated with age at first visit to the dentist, they also reveal that a greater proportion of those with family dentists than those without family dentists are favourably predisposed toward professional dental care.

3. With regard to sex, no significant difference was established between the attitudes of males and females in the Clinic group, regarding dental care. For the non-Clinic group though, sex was found to be significantly associated with attitudes toward dental care. While 64 per cent of the females in that group were favourably predisposed towards regular periodic dental

care, 43 per cent of the males were so predisposed. And whereas 57 per cent of the males were unfavourably predisposed to seek regular dental care, 36 per cent of the females had the same tendency.

The greater predisposition of females over males in the non-clinic sample, toward dental care, is consistent with the results of other studies. Some writers have suggested that the difference can be attributed to the greater importance females place on physical beauty (of which the teeth are a part.) The fact that no significant difference was found between the attitudes of males and females in the Clinic group might be attributed to the influence of the Clinic. Apparently, the Clinic has succeeded in transmitting to all its patients identical beliefs about the importance of regular dental care. It is possible too, that the difference in attitudes toward dental care noted for the non-Clinic group is the result of what Benedict[93] has referred to as "discontinuities" in the wider social system, where differing sets of social values have been prescribed for males and females. In other words, attitudinal differences between the sexes, whether in respect to dental care or health in general, are not inherent but learned.

4. Previous studies have indicated that economic status is significantly associated with one's readiness to seek voluntary medical and dental care. This study found no significant

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[93]Benedict, Ruth, "Continuities and Discontinuities in Cultural Conditioning" in Childhood in Contemporary Cultures (eds.) Mead, Margaret and Wolfenstein, Martha. The University of Chicago Press, 1955, pp. 21-30.

relationship between income level of the Clinic patients and their predisposition to seek dental care at regular intervals. Nevertheless, the attitudinal difference between the lower and the upper income groups in the non-Clinic group was found to be significant. Table X shows that 60 per cent of those persons in the $5000 and over" income group obtained high attitude ratings compared with 40 per cent of those in the "under $5000" income group. On the other hand, 58.9 per cent of those persons in the under $5000 income group obtained low attitude ratings on dental care compared with 37 per cent of those in the $5000 and over income group.

Here again, the lack of significant difference between the attitudes of the different income groups in the Clinic population can be attributed to the Clinic's influence. For there is only a nominal fee to be paid; and, that fee does not fluctuate with the patient's ability to pay. Furthermore, dental care is not received on a fee-for-service basis.

5. Education also was found to be positively related to attitudes toward dental care. Table XI shows that at each higher level of education the percentage of persons indicating favourable attitudes toward dental care increases. Conversely, as the level of education decreases the percentage of persons with low attitude scores decreases. Whereas 48.8 per cent of those persons who have completed more than nine years of school are shown to be predisposed to seek regular periodic dental care, under 27 per cent of those persons with "less

than nine years of school are so predisposed.

6. Demand for dental care which most studies have measured in terms of time elapsing since last visit, was found to be significantly related to source of treatment. A greater percentage of the Clinic patients than the non-clinic patients reported that less than 12 months had elapsed since they visited the dentist. It was felt, nevertheless, that since some of the Clinic patients might not have been visiting a dentist at regular intervals of less than 12 months prior to their being accepted at the Clinic a more reliable measure of visits for both groups would be frequency of visits.

Like length of time elapsing since the last visit to a dentist, frequency of visits was found to be significantly related to source of dental care. However, the direction of the association became reversed: a larger proportion of the non-clinic than Clinic patients were found to visit the dentist at regular intervals of less than 12 months. In other words: the Clinic patients revealed a greater tendency to visit a dentist only when something is wrong with their teeth, while the non-clinic patients were more likely to visit the dentist for preventive care.

The discrepancy between the results of the two measures of demand for dental care may be viewed this way: length of time elapsing since the last visit to a dentist does not take into account the patients' past dental history; that is,

it does not measure regularity of visits to the dentist; rather it measures only the recency of visit, which could have been for emergency treatment or for a periodic check-up. Table XIIB, page 88, shows that a greater proportion of the clinic patients than the non-clinic patients were likely to visit the dentist for emergency treatment or "when something is wrong": that is, 48 per cent of the Clinic patients reported that they usually visit a dentist when something is wrong (presumably, before they became patients at the Clinic) while 26 per cent of the non-clinic patients reported a similar pattern of visits.

The evidence demonstrates, therefore, that there is a significant difference between the utilization patterns of the two groups; and further, that 95 per cent of the time (see Table XIIB) the non-clinic patients will seek preventive dental care while the Clinic patients sought corrective or emergency treatment. Alternatively, a greater percentage of the non-clinic patients than the clinic patients had been following the recommended practice of visiting a dentist at regular periods of less than 12 months.

7. Frequency of visits was found to be significantly related to sex in the case of the non-clinic patients; but no significant association was established between sex and frequency of visits with respect to the Clinic patients. A greater percentage of the females than the males from the non-clinic sample reported that their practice was to visit the dentist

at regular intervals of less than 12 months. Table XIII, shows that 64 per cent of the females compared with 51 per cent of the males visit the dentist at regular intervals of less than 12 months, while 49 per cent of the males and 36 per cent of the females either neglect visiting the dentist for longer periods, or visit only when something is wrong, that is, when emergency treatment is needed.

The earlier argument concerning the absence of significant difference between males and females in the Clinic group in their attitudes toward dental care seems applicable, also, to the demand for dental care. Different attitudes and responses to health and illness between the sexes are learned rather than inherent. Thus, it appears that by being exposed to a uniform set of values about the teeth and the importance of regular dental care, male and female patients of the Clinic have come to accept the value of frequency of visits to the dentist as equally important for both sexes.

The finding of no difference between the sexes in their demand for dental care, with respect to the Clinic patients is an unusual one in view of previous studies. On the other hand, the significant association between sex and demand for dental care established for the non-clinic group is consistent with those studies. The explanation for the apparently contradictory findings is, as presented above, that Clinic patients are exposed to a similar set of ideas

about dental care while non-clinic patients have been socialized to accept differing ideas and practices for males and females. The Clinic would seem to have succeeded in neutralizing these.

8. Most studies have stressed the cost factor as a prime barrier to greater demand for dental care, and have argued that the demand for dental care varies with level of income. This study found that frequency of visits to a dentist is positively related to the level of income of the family-head. In both the Clinic and the non-clinic sample populations it was established that frequency of visits increased as incomes increased. As shown in Table XIV, in the Clinic group, 29 per cent of the persons having incomes of "less than $5000" per annum visit a dentist at intervals of less than 12 months while 57 per cent of those with an annual income of $5000 and over" visit at that frequency. Among the non-clinic group, 43 per cent of those persons with incomes of "less than $5000" per annum visit a dentist at regular intervals of less than 12 months compared with 68 per cent of those with incomes of $5000 and over."

Table XIV demonstrates also, that in the lower income group a higher percentage of persons tend to visit the dentist for emergency treatment rather than for preventive treatment; that is, they go "when something is wrong" with their teeth. Conversely, in the higher income group a larger percentage of persons tend to seek preventive dental care rather than

emergency treatment; that is, they go to the dentist at regular intervals of "less than 12 months" and not "when something is wrong" with their teeth.

9. Like income, level of education also was found to be positively associated with the demand for dental care. Table XV shows a consistent increase in the percentage of persons going to the dentist at regular intervals of "less than 12 months" as the level of education increases and an equally consistent decrease in the percentage of persons going to the dentist for emergency treatment (when something is wrong) as the level of education increases. Of the 45 persons with less than a Grade 9 education, approximately 27 per cent of them visit the dentist at regular intervals of less than 12 months, whereas 47 per cent of those in the "Grade 9 to 11" category show a corresponding frequency pattern. The pattern is almost identical when the two educational categories are compared in respect of the motive underlying the demand for dental care: over 73 per cent of those with less than a "Grade 9" education visit a dentist for emergency treatment (when something is wrong) and less than 54 per cent of those in the "Grade 9 to 11" category go to the dentist for emergency treatment.

The comparisons between demand for dental care and level of education have been confined to the less than "Grade 9" and "Grade 9 to 11" because of the small number of cases in the category "Grade 12 and over." However, when the

latter educational category is compared with the others in respect to frequency of visits to the dentist, the positive significant association between level of education and frequency of visits to the dentist is even more pronounced; nearly 59 per cent of the persons who have completed 12 or more years of school visit the dentist at regular intervals of less than 12 months, and less than 42 per cent of them visit when something is wrong; that is, for emergency treatment.

Three other variables for which no hypotheses had been formulated during the design stages of the study suggested themselves for further investigation. They all turned out to be significantly associated with the predisposition to seek regular dental care. Occupation, and fear of the dentist and the pain he is thought to inflict are discussed below. The third variable, age at first visit to a dentist has already been discussed (see page 123).

1. Occupation was found to be significantly associated with attitudes toward dental care. The classifications adopted were those used by the Dominion Bureau of Statistics in the 1961 Census of Canada. Table XVIII, shows that 63 per cent of the persons in the category designated "Professional" revealed a positive attitude toward dental care compared with 58 and 27 per cent of the "clerical" and the "Manual" categories. The percentage of persons with low or unfavourable attitude ratings is seen to increase with the movement away from the professional group toward the manual group. Between

the "Professional" and the "Manual" categories the attitudinal differences are very striking, in that more than twice as many persons in the latter category (77.4 per cent) as in the professional group (36.8 per cent) obtained low attitude ratings.

Freidson, who inferred attitudes toward dental care from the reported frequency of visits to the dentist, concluded indifference toward dental care can be explained in terms of the variations in education, income and occupation. In fact, he and his colleague found that 56 per cent of those persons in families whose main income-earner was in business or the professions, and in clerical or sales work see the dentist at least once a year, and only 27 per cent of those in families whose main earner was unskilled, semi-skilled or domestic worker.....see him regularly. As can be seen in Table XVIII, the present study partially supports Freidson's findings.

Unlike the Freidson study though, the association between occupation and attitudes toward dental care did not prove significant when "Father's Occupation" was taken as the independent variable. Table XVIII, shows the results for both the Clinic and the non-clinic adolescents. This finding suggests that while occupational class influences the attitude of the job incumbent it is less likely to affect the attitudes of those for whom the job incumbent is responsible.

2. Finally, attitudes toward dental care were found to be significantly associated with fear of the dentist and the pain he is thought to inflict. Table XIX, shows that a greater percentage of the non-clinic patients (31 per cent) than the Clinic patients (25 per cent) is likely to postpone dental care because of fear of pain.

This finding in no way indicates that non-clinic recipients of dental care visit the dentist less frequently than the Clinic patients. In fact, Table XIIC, shows that the demand for dental care is greater among the non-clinic patients than among the Clinic patients. It seems probable to conclude therefore that the Clinic patients did not neglect regular dental care so much because of fear of the dentist and the pain he is thought to inflict, but because of other intervening factors, which include: age at first visit to a dentist, level of education, income level and possibly, the social roles defined by occupational category.

With regard to the supply of dentists' services in relation to demand, the evidence leads to the conclusion that effective demand is being adequately met. Working an average of 38 hours a week and 47 weeks a year, each dentist provided dental care for 1,155 patients and saw each patient roughly two and one-half times during 1965. Although 30 per cent of the dentists were working at full capacity and could not accommodate additional patients, 64 per cent of them could accommodate additional patients. It is possible,

therefore, in theory at least, for those patients who have been refused by some dentists to get their dental care from those dentists working below full capacity.

But the picture is different when supply of dentists is approached from the standpoint of potential demand for dental care. If each person above the age of 3 years old were to demand two visits a year, 266 dentists would be needed to satisfy such a demand. However, the classified section of the telephone directory showed a total of 203 dentists registered in Metropolitan Winnipeg.

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A P P E N D I C E S

APPENDIX I

DATA COLLECTED FROM CLINIC RECORDS

TABLE 1A

AGE AND SEX DISTRIBUTION OF CLINIC PATIENTS

Age	Sex				Total	
	Males		Females			
	No.	%	No.	%	No.	%
Under 13	10	(16.1)	13	(16.1)	23	(16.1)
13 - 19	17	(27.3)	23	(2.84)	40	(28.0)
20 - 29	7	(11.3)	13	(16.1)	20	(13.98)
30 - 39	10	(16.1)	16	(19.8)	26	(18.10)
40 - 49	6	(9.7)	8	(9.9)	14	(9.83)
50 and over	12	(19.4)	8	(9.9)	20	(13.98)
Total	62	(100)	81	(100)	143	(100)

TABLE 1B

SUMMARY OF PERCENTAGE DISTRIBUTION OF DENTAL NEEDS AMONG CLINIC PATIENTS BY AGE, SEX AND TYPE OF NEED

Type of Dental Need	Age and Sex											
	Less than 13 yrs.		13-19 yrs.		20-29 yrs.		30-39 yrs.		40-49 yrs.		50 and over	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Caries Control	30	15	41	39	43	30	10	36	50	38	33	63
Periodontal disease	--	--	50	12	71	30	100	63	67	38	38	38
Malocclusion	10	23	35	4	71	15	40	25	17	25	--	13
Prosthetic Restoration	50	23	48	18	85	62	80	63	83	75	83	63
Prophylaxis	70	39	35	15	71	23	90	38	50	--	8	38
Endodontic Care	--	8	47	12	--	31	--	13	17	13	17	13

APPENDIX II

INTERVIEW DATA ON CLINIC AND NON-CLINIC SAMPLES

TABLE 2A

AGE AND SEX DISTRIBUTION OF CLINIC AND NON-CLINIC SAMPLES

AGE - GROUP	Clinic Sample					Non-Clinic Sample				
	Male		Female			Male		Female		
	No.	%	No.	%	Total	No.	%	No.	%	Total
13-19	20	(20)	19	(19)	39	65		75		140
20-29	9	(9)	12	(12)	21	--	--	--	--	--
30-39	7	(7)	9	(9)	16	--	--	--	--	--
40-49	5	(5)	6	(6)	11	--	--	--	--	--
50 and over	4	(4)	9	(9)	13	--	--	--	--	--
Total	45	(45)	55	(55)	100	65	(46)	75	(54)	140

TABLE 2B

DISTRIBUTION OF POPULATIONS BY INCOME GROUP

INCOME GROUP	Clinic Sample		Non-Clinic Sample		
	No.	%	No.	%	Total
Under $2000 p.a.	8	(8)	18	(12.9)	26
$2000-$2999 "	5	(5)	14	(10.0)	19
$3000-$3999 "	17	(17)	7	(5.0)	24
$4000-$4999 "	35	(35)	21	(15.0)	56
$5000-$5999 "	15	(15)	15	(10.7)	30
$6000-$6999 "	6	(6)	19	(13.6)	25
$7000 and over	8	(8)	50	(35.7)	58
Not stated	6	(6)	--	--	6
Total	100	(100)	140	(100)	240

TABLE 2C

DISTRIBUTION OF POPULATIONS BY YEARS OF SCHOOLING COMPLETED

Years of Schooling Completed	Clinic Sample		Non-Clinic Sample	
	No.	%	No.	%
Less than 9 years	45	(45)	--	--
9 - 11 years	43	(43)	140	100
12 years and over	12	(12)	--	--
Total	100	(100)	140	(100)

TABLE 2D

DISTRIBUTION OF POPULATIONS BY OCCUPATION OF FAMILY-HEAD

Occupation of Family Head	Clinic Sample		Non-Clinic Sample	
	No.	%	No.	%
Managerial	8	(8)	21	(15.0)
Professional and Technical	11	(11)	17	(12.1)
Clerical	9	(9)	4	(2.9)
Sales	10	(10)	13	(9.2)
Skilled operators	34	(34)	36	(25.6)
Manual and Service	19	(19)	26	(18.6)
Other	9	(9)	23	(16.6)
Total	100	(100)	140	(100)

TABLE 2E

DISTRIBUTION OF POPULATIONS BY SOURCE OF DENTAL CARE

Source of Dental Care	Clinic Sample		Non-Clinic Sample	
	No.	%	No.	%
University Dental School Clinic	62	62	--	--
Hospital Dental Clinic	1	1	3	2.2
Family Dentist	4	4	122	87.1
Other Source	33	33	15*	10.7
Total	100	100	140	100

* Includes 2 persons who have never visited a dentist.

APPENDIX III

RELATIONSHIP BETWEEN SEX AND TYPE OF DENTAL NEEDS

TABLE 3A

RELATIONSHIP BETWEEN SEX AND NEED FOR CARIES CONTROL

Caries Control	Sex		
	Male	Female	Total
Persons Needing Treatment	52	58	110
Persons Not Needing Treatment	19	20	39
Total	71	78	149

$X^2 = 0.139$; DF = 1

$P > .05$

TABLE 3B

RELATIONSHIP BETWEEN SEX AND NEED FOR ORTHODONTIC TREATMENT

Orthodontic Treatment	Sex		
	Male	Female	Total
Persons Needing Treatment	27	25	52
Persons Not Needing Treatment	44	53	97
Total	71	78	149

$X^2 = 0.625$; DF = 1

$P > .05$

TABLE 3C

RELATIONSHIP BETWEEN SEX AND PERIODONTAL DISEASES

Periodontal Diseases	Sex		
	Male	Female	Total
Persons Affected	25	35	60
Persons Not Affected	46	43	89
Total	71	78	149

$X^2 = 1.96$; DF = 1

$P > .05$

TABLE 3D

RELATIONSHIP BETWEEN SEX AND NEED FOR PROSTHODONTIC TREATMENT

Prosthodontic Treatment	Sex		
	Male	Female	Total
Persons Needing Treatment	14	20	34
Persons Not Needing Treatment	57	58	115
Total	71	78	149

$X^2 = 0.39$; DF = 1

$P > .05$

TABLE 3E

RELATIONSHIP BETWEEN SEX AND NEED FOR ENDODONTIC TREATMENT

Endodontic Treatment	Sex		
	Male	Female	Total
Persons Needing Treatment	18	15	33
Persons Not Needing Treatment	53	63	116
Total	71	78	149

$X^2 = 0.83$; DF = 1

$P > .05$

APPENDIX IV

RELATIONSHIP BETWEEN SOCIO-ECONOMIC VARIABLES AND THE DEMAND FOR, AND ATTITUDES TOWARD DENTAL CARE

TABLE 4A

RELATIONSHIP BETWEEN ATTITUDES TOWARD DENTAL CARE AND SOURCE OF DENTAL CARE (CLINIC vs. NON-CLINIC ADOLESCENTS)

ATTITUDE RATING	Source of Dental Care					
	Clinic		Non-Clinic		Total	
	No.	%	No.	%	No.	%
High	16	(41)	76	(54.3)		
Low	23	(59)	64	(45.7)		
Total	39	(100)	140	(100)	179	(100)

$X^2 = 2.41$; DF - 1

$P > .05$ (one-tailed test)

TABLE 4B

RELATIONSHIP BETWEEN AGE AND ATTITUDES TOWARD DENTAL CARE

CLINIC GROUP

ATTITUDE RATING	Age-Group				
	13-19		20 and over		Total
	No.	%	No.	%	No.
High	16	(41)	24	(34.4)	40
Low	23	(59)	37	(65.6)	60
Total	39	(100)	61	(100)	100

$X^2 = .926$; DF = 1

$P > .05$

APPENDIX V

TABLE 5A

SUMMARY OF RESULTS OF TESTS OF RELATIONSHIP BETWEEN SOCIO-ECONOMIC VARIABLES AND ATTITUDES TOWARD DENTAL CARE

	X^2 Significance Tests			
	X^2		P	DF
1. Relationship between age and attitudes toward dental care...				
Clinic Sample...	1.74	>	.05	2
2. Relationship between Sex and Attitudes toward Dental Care...				
Clinic Sample.....	.38	>	.05	1
Non-Clinic Sample	4.78	<	.05	1
3. Relationship between income level and attitudes toward dental care....				
Clinic Sample...	1.09	>	.05	1
Non-Clinic Sample	5.01	<	.05	1
4. Relationship between Education and Attitudes toward Dental Care....				
Clinic Sample...	5.95	<	.05	2
5. Relationship between Occupation and Attitudes toward Dental Care:				
Clinic Sample...	8.04	<	.05	3

Table 5A Continued.....

	X^2 Significance Tests			
	X^2		P	DF
6. Relationship between Father's Occupation and Attitudes Toward Dental Care....				
Non-Clinic Sample..	0.79	>	.05	3
Clinic Sample....	2.91	>	.05	3

TABLE 5B

SUMMARY OF RESULTS OF TESTS OF RELATIONSHIP BETWEEN SOCIO-ECONOMIC VARIABLES AND DEMAND FOR DENTAL CARE

	X^2 Significance Tests			
	X^2		P	DF
1. Relationship between Sex and Demand for Dental Care:				
Clinic Sample...	1.19	$>$	.05	2
Non-Clinic Sample	4.61	$<$	.05	2
2. Relationship between Income Level and Demand for Dental Care:				
Clinic Sample...	9.70	$<$	.05	2
Non-Clinic Sample	9.28	$<$	.05	2
3. Relationship between Education and Demand For Dental Care:				
Clinic Sample...	5.77	$<$	.05	2

APPENDIX VI

DENTAL HEALTH SURVEY

Instructions:

Please answer each of the following questions by placing a check mark ( ) in the blank space provided. Check that part of each question or statement which applies to you or most nearly expresses your feeling on the matter.

SECTION A

1. Identification Number_____.
2. Sex: Male. Female (encircle one).
3. Age at last birthday_____.
4. Education (Years of schooling completed):

   (i) Elementary School 1-4 years ( ) 5 years and over

   (ii) High School: 1-2 years ( ) 3-6 years

   (iii) University: 1-2 years ( ) 3 years and over.

5. Occupation_____ 6. Annual Income_____
7. Father's Education (Years of schooling completed):

   (i) Elementary School 1-4 years ( ) 5 years and over

   (ii) High School: 1-2 years ( ) 3-6 years

   (iii) University: 1-2 years ( ) 3 years and over

8. Mother's Education (Years of schooling completed):

   (i) Elementary School: 1-2 years ( ) 5 years and over ( )

   (ii) High School: 1-2 years ( ) 3-6 years ( )

   (iii) University: 1-2 years ( ) 3 years and over ( )

9. Father's Occupation_____.

10. Father's annual income: Under $2000 ( ) $2000-$2999 ( )
$3000-$3999 ( ) $4000-$4999 ( )
$5000-$5999 ( ) $6000-$6999 ( )
$7000 and over ( ).

11. Mother's Occupation_____

12. Mother's annual income_____

13. Do you live with your parents? Yes_____ No_____

SECTION B

14. How old were you when you made your first visit to the dentist?

_____ At the age of 3 years or before

_____ Between the age of 3 years and 4 years

_____ Between age 4 years and 7 years old

_____ Between age 8 years and 13 years old

_____ Between age 14 years and 20 years old

_____ At age 21 years or older

_____ Don't know.

15. When was the last time you visited the dentist?

_____ 6 months ago and under

_____ 6 months and up to 1 year ago

_____ 1 year and up to 2 years ago

_____ 2 years and up to 5 years ago

_____ 5 years ago

_____ Have never been to a dentist

_____ Don't know or can't remember.

16. Which of the following services did you seek?

_____ Comprehensive examination

_____ Filling one or more teeth

_____ Extracting one or more teeth

_____ Straightening one or more teeth

_____ Cleaning one or more teeth

_____ A check-up only

_____ Toothache relief

_____ Other

17. How many teeth have you had filled?

_____ None

_____ One or two

_____ Three or four

_____ Five or six

_____ Seven or eight

_____ Nine or ten

_____ Eleven or twelve

_____ Over twelve

18. How much trouble, in the past, have you had with your teeth?

_____ A great deal of trouble

_____ Some trouble

_____ Little trouble

_____ No trouble

19. What kind of gum trouble have you had, if any?

_____ Bleeding

_____ Redness

_____ Swelling and soreness

_____ Other kind of trouble

20. How would you describe the present condition of your gums?

_____ Very good condition

_____ Good condition

_____ Fair condition

_____ Poor condition

_____ Don't know, not sure.

21. How would you describe the present state of your teeth?

_____ Very good

_____ Good

_____ Poor

_____ Very poor

_____ Don't know, not sure.

22. How many of your permanent (second) teeth have been extracted?

_____ None

_____ One or two

_____ three or four

_____ five or six

_____ seven or eight

_____ nine or ten

_____ eleven or twelve

_____ Over twelve

_____ Don't know how many.

23. Check any of the following statements which describes your present dental condition.

_____ Have all my natural teeth

_____ Need dentures

_____ Wear partial dentures

_____ Wear full dentures

_____ Other comment (specify)_____

_____

_____

24. How many of your teeth need straightening?

_____ None

_____ One or two

_____ Three or four

_____ Five or six

_____ Seven or eight

_____ Nine or ten

_____ Over ten

_____ Don't know

25. Which of these services do you use? Check all those which apply.

_____ University Dental School Clinic

_____ Hospital dental clinic

_____ Family dentist

_____ None of these

_____ All of these

_____ Other source (specify)_____

_____

26. How long do you spend at the dentist at each visit?

_____ Less than half-an-hour

_____ Half-an-hour to 1 hour

_____ Between 1 and 2 hours

_____ Between 2 and 3 hours

_____ Over 3 hours

27. Have you ever heard the word fluoridation?

_____Yes . _____No. _____Don't remember.

28. Which of these would you associate with fluoridation?

_____ Face powder

_____ The reduction of headache

_____ Drinking water

_____ The reduction of earache

_____ Don't know.

29. How often do you visit the dentist?

_____ Every six months

_____ Between 6 months and 1 year

_____ Between 1 year and under 2 years

_____ Every two years

_____ Between 3 and 5 years

_____ When I think something is wrong with my teeth

_____ Any other time (specify)_____

_____

_____

30. If your family suddenly had to pay out a dental bill of $200, how would your family handle this?

_____ Would find paying somewhat difficult

_____ Would not be able to pay

_____ Would pay without any difficulty

_____ Would find it very difficult to pay

_____ Would pay without too much difficulty.

SECTION C.

31. How old should a child be when he/she makes the first visit to the dentist?

_____ Before starting school

_____ When something is wrong

_____ At the age of three years old or before

_____ Some other age (specify)_____

_____ Don't know

32. Which of the following times is often recommended by dentists for brushing the teeth?

_____ On rising and on going to bed

_____ After meals

_____ Some other time

_____ After meals and on going to bed

_____ Don't know, not sure.

33. What times do you actually brush your teeth?

_____ On rising and on going to bed

_____ After meals

_____ Some other time

_____ After meals and on going to bed

_____ Any time available

34. Which of these do you consider the best toothbrushing practice for healthy teeth?

_____ On rising and on going to bed

_____ After meals

_____ Some other time

_____ After meals and on going to bed

_____ Don't know, not sure.

35. Which of the following materials do you use when brushing your teeth?

_____ Water only

_____ Salt and soda or other home preparation

_____ Fluoride toothpaste or powder

_____ None of the above

_____ Any other material

36. Which of these substances is usually recommended by dentists?

_____ Water only

_____ Salt and soda or other home preparation

_____ Fluoride toothpaste or powder

_____ Any other material

_____ Don't know, not sure

37. In your opinion, which of these substances is the most desirable for teeth care?

_____ Water only

_____ Salt and soda or other home preparation

_____ Fluoride toothpaste or powder

_____ Any other material (specify)_____

_____

_____ Uncertain

38. If teeth come in straight, they can still shift and become crooked later.

_____ Strongly disagree

_____ Disagree

_____ Don't know

_____ Agree

_____ Strongly agree.

39. Once you get your permanent teeth, what you eat or drink can't affect in any way how much your teeth decay.

_____ Agree

_____ Strongly agree

_____ Don't know, not sure

_____ Don't know, not sure

_____ Disagree

_____ Strongly disagree

40. Toothbrushing instructions in a dental office or clinic are unnecessary for children under 7 years old.

_____ Strongly agree

_____ Agree

_____ Don't know, not sure

_____ Strongly disagree

_____ Disagree

41. Once a child starts losing some of his/her "baby teeth" no useful purpose is served trying to save the others since these will be lost eventually.

_____ Strongly agree

_____ Agree

_____ Not sure, don't know

_____ Strongly disagree

_____ Disagree

42. A person can always tell if there is something wrong with his teeth and gums.

_____ Strongly agree

_____ Agree

_____ Not sure, don't know

_____ Strongly disagree

_____ Disagree

43. No matter how well you take care of your teeth, eventually you will lose them.

_____ Strongly agree

_____ Agree

_____ Not sure, don't know

_____ Strongly disagree

_____ Disagree

44. When a child reaches school age it is no longer necessary for the parents to help him with toothbrushing.

_____ Strongly agree

_____ Agree

_____ Not sure

_____ Strongly disagree

_____ Disagree

45. Dentists tell you there's more wrong with your teeth than there really is.

_____ Strongly agree

_____ Agree

_____ Strongly disagree

_____ Disagree

_____ Undecided, not sure

46. How often does fear of pain keep you from seeking the dental attention you think you need?

_____ Always

_____ Most of the time

_____ Never

_____ Hardly ever

_____ Sometimes

47. Denture wearers look more attractive than people with imperfect natural teeth.

_____ Strongly agree

_____ Agree

_____ Strongly disagree

_____ Disagree

_____ Undecided

48. An attractively dressed person with poor teeth should more easily obtain a job than a poorly dressed person with health teeth.

_____ Strongly agree

_____ Agree

_____ Strongly disagree

_____ Disagree

_____ Don't know, not sure.

49. It is not necessary for working class people to have as good teeth as professionals and public officials.

_____ Strongly agree

_____ Agree

_____ Undecided

_____ Strongly disagree

_____ Disagree

50. I would visit the dentist more often if I could spare the time.

_____ Strongly agree

_____ Agree

_____ Uncertain

_____ Disagree

_____ Strongly disagree

51. Lack of money for household goods and dental treatment might be the main reason why people don't visit the dentist more often.

_____ Strongly agree

_____ Agree

_____ Don't know

_____ Strongly disagree

_____ Disagree

52. To what extent would you approve of a national (government sponsored) dental insurance plan?

_____ Strongly approve

_____ Approve

_____ Undecided, not sure

_____ Strongly disapprove

_____ Disapprove

53. Suppose the cost of dental work, (fillings, bridge, crown) to be done to someone you know if $400.00, and the cost of extracting the rest of the teeth and getting a set of false teeth is $200, what should this person do?

_____ Have the fillings, bridgework and crown done.

_____ Have the teeth extracted and get the false teeth.

_____ Wait until he can afford the fillings, etc.

_____ Undecided about what should be done.

_____ Any other comment_____

_____

54. The best way to prevent tooth decay is for everyone in the community to drink fluoridated water.

_____ Strongly disagree

_____ Disagree

_____ Undecided, not sure

_____ Strongly agree

_____ Agree.

55. How important would you say the appearance of one's teeth are in making friends?

_____ Somewhat important

_____ Very little importance

_____ Doesn't matter

_____ Very Important

_____ Uncertain

56. The appearance of one's teeth is of no great importance in dating among young people.

_____ Strongly agree

_____ Agree

Undecided _____ Strongly disagree_____

Disagree _____

APPENDIX VII

SURVEY OF DENTAL PRACTICE: METROPOLITAN WINNIPEG

Please supply the information sought below, giving estimates where the actual data are not available.

1. Respondent's age_____

2. Sex_____

3. Type of dental practice (general practice or other specialty)_____

4. How many hours of chair service do you offer per week?

5. How many weeks of practice do you offer per year?

6. How many different patients were treated by you in 1965?

7. How many patient visits (sittings) did you have in 1965?

8. How long would a new adult patient have to wait for an appointment for the following services?

   (a) Initial examination_____
   (b) Operative session_____

9. Could you accommodate new patients in any of these categories:

   (a) New adults_____
   (b) New children_____