QUALITY OF LIFE AMONG ELDERLY AND ITS RELATION TO DENTAL CARE

Dr. REETHU S,

Ph.D. THESIS

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SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM,

THIRUVANANTHAPURAM

QUALITY OF LIFE AMONG ELDERLY AND ITS RELATION TO DENTAL CARE

A THESIS PRESENTED BY

Dr. REETHU S

TO

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY, TRIVANDRUM, THIRUVANANTHAPURAM

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF

DOCTOR OF PHILOSOPHY 2020

DECLARATION

I, **Reethu S** hereby certify that I had personally carried out the work depicted in the thesis entitled, **"Quality of life Among Elderly and its Relation to Dental Care "**. No part of the thesis has been submitted for the award of any other degree or diploma prior to this date.

Reethu S

DECLARATION

Dr. V. Raman Kutty, MD, MPhil, MPH (Harvard)
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This is to certify that **Dr. Reethu S** in the department of **Health Science Studies** of this Institute has fulfilled the requirements prescribed for the Ph. D degree of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum.

The thesis entitled, **"Quality of the Life among elderly and its relation to dental care"** was carried out under my direct supervision. No part of the thesis was submitted for the award of any degree or diploma prior to this date.

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Signature

Date: 10/06/2020

The thesis entitled

Quality of life among elderly and its relation to dental care

Submitted by

Dr. Reethu S

for the degree of
Doctor of Philosophy

of

SREE CHITRA TIRUNAL INSTITUTE
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THIRUVANTHAPURAM

Is evaluated and approved by

Dr. V Raman Kutty

Guide

4/5/2021

4.5.2021

Thesis examiner

This thesis is dedicated to my parents
for their endless love, support
and encouragement

Acknowledgement

It is with deep sense of gratitude, satisfaction that I submit this dissertation. I take this opportunity with much pleasure to thank all who contributed in many ways for the success of this study.

I have no words to express my deepest sense of gratitude and respect to my Supervisor Dr. V Ramankutty, Formerly Professor and HOD, AMCHSS, who offered continuous advice, constant encouragement, inspiring discussions and valuable suggestions to do this work with confidence. He took significant effort for the successful completion of this endeavour.

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Lastly to almighty, I bow down in your presence for giving me strength, courage and for providing good health for completing this work.

Reethu S

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Abbreviation

AMCHSS- Achutha Menon Center for Health Science Studies

ASHA- accredited social health activist

C.I. - Confidence Interval

CFA – Confirmatory Factor Analysis

COPD- Chronic obstructive pulmonary disease

CPITN- Community Periodontal Index of Treatment Needs

CVI - Content Validity Index

CVR-Content Validity Ratio

DAC - Doctoral Advisory Committee

DMFT- decayed missing filled teeth

EFA - Exploratory Factor Analysis

HIV - Human immunodeficiency virus

HOD – head of the department

GOHAI- geriatric oral health assessment index

IEC - Institutional Ethics Committee

KMO - Kaiser-Meyer-Olkin

LSGD- local self-government department

N – Number (Size) of Total Population

n – Number (Size) of Total Sample

NA - Not Available or Not Applicable

No. – Number

OHRQoL- oral health related quality of life

OECD- Organisation for Economic Co-operation and Development

QoL- quality of life

SCTIMST - Sree Chitra Tirunal Institute for Medical Sciences and Technology

SD - Standard Deviation

Sig. – Significant

TAC - Technical Advisory Committee

UN – United Nations

WHO – World Health Organization

SYNOPSIS

of the

PhD Dissertation

titled

"Quality of life among elderly and its relation to dental care"

Submitted by

Reethu S

PhD scholar (PhD/PT/02)

Under the supervision of

Professor. V Raman Kutty,

Professor,

AMCHSS, SCTIMST.

1. Background

The world population is aging; the proportion of older population is increasing at a faster rate than any other age group. The rising number of older population was 8% in 1950 to 11% in 2007 which will increase to 22% in 2050[1]. About 60% of the older population are living in developing countries. The rise in life expectancy is mainly due to the improved health care facilities, sanitation, and environment and living conditions[2]. According to the national policy 1999, a person above the age of 60 is considered as older person.

According to the census 2011, there are nearly 104 million elderly persons aged 60 and above in India. The proportion of older population had increased from 5.6% in 1961 to 8.6% in 2011. Both the share and size of the older population is increasing day by day. About 71% of the older people are residing in rural parts of the country. An important point to be noted that the dependency of the older people had increased from 10.9% to 14.2% in 2011[3]. Kerala has the maximum number of older people in the country divulge that Kerala has the highest proportion of older people in its population that is 12.6%. This is due to improved life style and better medical care[4].

One of the major challenges in the 21st century is to improve the health of the older population. It has been a great challenge to health and policy makers because disease pattern shifts concurrently. NCD's like diabetes, hypertension and cardiovascular diseases rules the old age and studies showed that they are the leading causes of both mortality and disability. WHO in view of this growing challenge had launched a program "active aging" which outlines the concept of healthy aging. The aim of this program is to minimize the risk factors and to maximize the protective factors; thereby the older population could enjoy longer life and higher quality of life[5].

Oral health is an important component of active aging. Poor oral health has been reflected as a risk factor for general health in older population. The experience of pain due of dental infections, problems with eating and chewing, embarrassment about the shape of teeth or about missing teeth, discoloured or damaged teeth can adversely affect people's daily lives self-esteem and well-being. The interrelationship between oral health and general health is particularly pronounced among older people. Poor oral health can increase the risks to general health (eg: periodontal diseases are considered as the 6th complication of diabetes and also periodontitis has close association with ischemic heart diseases and chronic respiratory illness) and with compromised chewing and eating abilities (eg: edentulous

people tend to avoid dietary fibre and prefer more of food rich in saturated fats), affect nutritional intake. Similarly, systemic diseases and the adverse side effects of their treatments can lead to increased risk of oral diseases, dry mouth and altered sense of taste and smell. The high prevalence of multi-medication therapies in advanced age may further complicate the impact on oral health and oral health care. The most common oral health issue faced by older people today is tooth loss, dental caries, high prevalence of periodontal diseases and oral precancerous lesion. Improving the oral health will enhance the physical, social and mental attributes of older people and they will have a better quality of life. The oral health problems of elderly are countless, but the resources available in our country are less. Oral health survey 2003 had reported that the prevalence of dental diseases among older population in India is high. Lack of supportive oral health programmes, low socio-economic status, and lack of perceived need, neglect of oral conditions and dependency of the older person are also serious issues which need to be addressed[5]. There is no support for separate dental treatment for older people in India. The older people have to approach the private sector to get dental care. The cost of these treatments is not affordable to most of them. Government provides health insurance to people but dental treatment is excluded in these packages. So most of the older people perceive oral health treatment needs but it remains unattended.

2. Rationale

Oral Health is an important component of the general health of the people. The high prevalence and severity of oral diseases such as dental caries, periodontal disease and Oral cancer lead to significant reduction in quality of life and productivity. The prevalence of dental caries was 84.7%, periodontal diseases 79.4% and edentulous was 29.3% among older people in 2003.There is no reliable and authentic data on prevalence of dental diseases in India and all-over national survey was conducted in 2002-03 by the dental council of India. There are no data available about the present status of oral conditions in general population as well as older population.

Dental care is predominantly given by the private sector in our country; the cost of the dental treatment is unaffordable to most the people. The services provided by the public sector are only through the district hospital and teaching institutions which are few in number. This results in issues of accessibility and availability of services. It is unfortunate that there has neither been any systematic assessment of the needs of the population nor of the impact of the existing

services on the oral health of the people. There are no nation-wide data on utilisation of dental services. There were studies conducted in Udaipur, Karnataka and Haryana which showed utilisation of dental services among older population is low. There are potential barriers in access to dental care. In India, people encounter various obstacles in utilization of dental services which need to be studied.

The Quality of life in older people is becoming more and more important now a days because there is a significant increase in number of older populations. Overall health of a person doesn't mean just the absence of disease, but it should add meaning to that person's life with progressive years. Oral health related quality of life (OHRQoL) is an integral part of general health and well-being and is recognized by WHO as an important part of oral health program. So, the impact of perceived oral health needs on quality of life of a person is not well assessed in our setting. It is important to know how perceived need and long-standing dental diseases has impact on a person's quality of life.

A number of studies on perceived oral health care needs and normative oral health care needs were done in developed countries. In this study, oral health care needs of older population were categorised into normative and perceived needs. Normative oral health care needs are needs assessed by the professional and perceived oral health care needs are the need the person perceives. The normative need of the older person is assessed in the clinic, but their perceived needs are not assessed and this has impact on treatment outcome. It is more important to think about how a patient feels than how a doctor thinks they ought to feel. The reality is that people's perception of oral health has less relation to clinical assessment of oral health.

At present there are few valid and reliable questionnaires devised for use in India. Most of the studies do not cover all the domains in perceived oral health care need assessment. To best of our knowledge, no study in India was done to assess the gap between perceived and normative oral health care needs. Most of the studies mainly focus on perceived impact on dental health rather than on the perceived need. Developing a questionnaire which addresses the various dimensions of perceived oral health needs among older population is the need of the hour.

3. Conceptual framework

We did a review of published literature on perceived oral health care needs and barriers in utilization of dental services. We included needs, health needs, perceived needs, oral health needs, utilization of dental services and barriers in utilization of dental services.

In this study, the primary outcome of interest was whether older people perceived different type of dental care need but unable to obtain it. We also considered reasons why an older person had an unmet need and the barriers they face. (figure 1)

The variables for developing the model were developed from:

1. Perceived need and normative need from Bradshaw's theory of social needs[6]

2. Barriers to utilization of services were selected from Penchansky model[7].

3. The predisposing factors were taken from Andersen et al (1983) generic behavioural model[8].

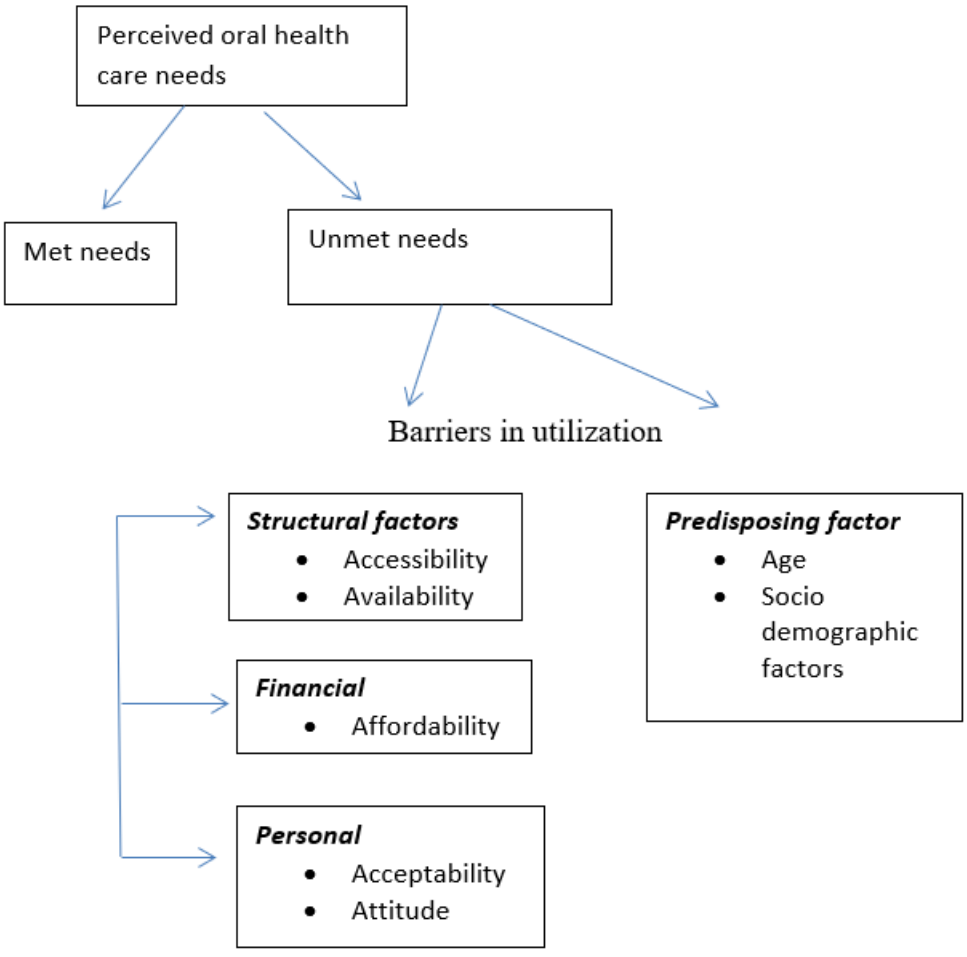

Figure1: Conceptual framework

4. Objectives

1. To develop and validate a tool to measure the perceived oral health care needs and barriers in the utilization of dental services among the older population.

2. To assess the normative oral health care needs of the older population using an available validated tool.

3. To estimate or assess the gap between normative oral health care needs and perceived oral health care needs.

4. To investigate the impact of oral diseases on oral health-related quality of life (OHRQoL) using the GOHAI (Geriatric Oral Health Assessment Index) questionnaires.

5. Methodology

This study is a multiphase, mixed method study which uses both qualitative and quantitative tools. (Figure 2)

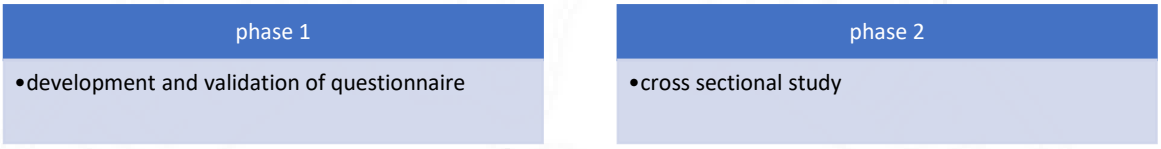

Figure 2: study methods

Phase I- development and validation of a questionnaire

A questionnaire was developed and validated to measure the perceived oral health care needs and barriers in utilization of dental services among older people. The validation study was conducted in Kollam district. The ethical clearance for the study was obtained from the Institutional Ethics Committee of Sree Chitra Tirunal Institute for Medical Sciences and Technology.

The first step in developing a questionnaire is to define the construct of perceived oral health care needs and barriers in utilisation of dental services. Perception of health is subjective, perceived need shows the degree of deficiency and dysfunction resulting from the health condition, along with individuals' perceptions and attitudes regarding the condition. Utilization is not just the willingness of people to seek care but the actual attendance at the site of delivery of health care services to receive care.

The sources of items for the questionnaire were literature search, in-depth interviews with older people of varying socio-economic status (key informant interview), and expert interviews. The literature search and interviews were done till the saturation of information is reached. The interviews were transcribed and codes were generated. Weft QDA was used for generating codes of the interviews after the coding were achieved, the data was

interrogated and systematically explored to generate meaning. Categories with similar meaning were grouped together[9]. Domains and themes were created from the codes. An initial draft of questionnaire with 51 items were developed. The initial draft consists of 20 items in perceived oral health care needs and 31 items in barriers in utilization of dental services.

Content validity was ensured by submitting the scale to experts for review. The content validity was assessed by testing the level of agreement among experts. For measuring the agreement of experts on the content of scale, we circulated the preliminary draft to the purposively selected experts. The sample of the experts was 8 in number and they consisted of 5 experts in dentistry and 3 experts from the field of public health for evaluation. The draft was modified considering the written and oral feedback of the experts. The content of the final version was further assessed by thesis supervisor. After content validation 6 items are removed and 4 items were modified. So the total number of items after content validation was 45.

English is not the first language of the respondent population so, tool was translation to Malayalam. Translation was done to achieve conceptual equivalent of a word or a phrase, and not a word-for-word translation. The meaning of the sentence was adapted and tried of give the best of the translation in simple, clear and understandable manner[10]. The validation was done in two Panchayats of Kollam district randomly selected using lottery method. The selected panchayats were Anchal Panchayat and Chathanoor Panchayat. Survey was conducted by the principal investigator with the help of ASHA workers. The lists of older people in the panchayat were provided by the ASHA workers and from the voters list. The preliminary draft of the questionnaire consisted of 30 items. Based on the ratio (1: 5) of items and respondents, we administered the scale among 150 respondents. Face validity is ensured by subjecting the scale to the examination of experts in the field. It is done by providing the scale to public health experts, dentists ‘practicing in rural, urban, government and private sector, older people of varying socio economic class and general population. Face validity is used to explain, whether the scale covers all the relevant domains. Questionnaire was submitted to 30 experts, in order to have a better validation process. Four questions were removed after face validity check. Internal consistency reliability using the cronbach’s alpha statistic and test-retest reliability were used to examine the reliability of the questionnaire. Factor analysis was done to achieve item reduction.

In phase II, a cross-sectional survey was conducted to assess the perceived oral health care needs and barriers in utilization of dental services by using the questionnaire developed in phase I. The normative oral health needs (clinical) and oral health related quality of life was also assessed in this phase. The Questionnaire consisted of four parts. The first part consisted of socio-demographic details. The second part was the developed questionnaire on perceived oral health care needs, its barriers in dental service utilization which is used to assess the perceived need and the barriers they face in receiving dental care. The third part consists of GOHAI questionnaire which measures self-reported measure based on functional definition of health. The fourth part consists of normative oral health assessment ie clinical assessment of oral health status of older person using WHO oral health assessment form 2013.

The sample size was estimated to be 381 after adding 20% non-response rates and the sample size was rounded off to 400. The older people above the age of 60 were included in the study. Those who did not give a consent to participate were excluded. There was an equal division of sample for both urban and rural areas and gender. The urban participants are selected from Kollam Corporation and rural participants from Kalluvathukkal Grama Panchayath. The sample of the study was selected from Voters list (list given by LSGD) randomly based on the ratio of rural to urban in the original sampling frame. The final participants for the survey were identified through circular systematic random sampling. The people was contacted by personally or with the help of ASHA worker of the area or/and by telephone. Those who verbally consented to a one to one meeting was approached directly at their current residences, work places or any other convenient place of their choice for the survey. In order to facilitate field work, the older people was grouped by location; home addresses whichever was comfortable by the people upon initial contact. The principal investigator has visited each of the identified addresses to collect data.

Results

A. To develop and validate a tool to measure the Perceived oral health care needs and barriers in utilisation of dental services among the older population.

The process of tool development and validation was conducted in three sub phases:

I. *Conceptualization of the construct of perceived oral health care needs and barriers in utilisation of dental services*- a conceptual framework emerged from this sub phase which explained the construct of "perceived oral health care needs and barriers in utilisation of dental services" and was constituted by 2 domains in the perceived oral health care questionnaire namely –perceived oral health care needs and dental visits and experiences. The barriers in utilisation of dental visit has 2 domains they are personal barriers of older people and barriers associated with dentist and dental treatment. (Figure: 3). the domains emerged from both the literature review and the qualitative interviews (with dental professionals and community members).

PERCEIVED NEED AMONG OLDER PEOPLE	BARRIERS IN UTILISATION OF DENTAL SERVICES
Perceived oral health care needs	Personal barriers of older people • Low priority • Affordability issues • General health issues • Time issues • Home remedy • fear
Dental visits and experience	Barriers associated with dentist and dental treatment • Lack of clarity and objectivity • Delay in treatment • Dentist behavior

Figure 3: domains of the questionnaire.

II. Creation of items pool for the questionnaire

The primary item pool of 51 items (20 items in perceived oral health care needs and 31 items in barriers in utilisation of dental services) were created by the investigator and subjected to multiple rounds of expert consultation and literature review.

III. Validation of the questionnaire.

All 51 were subjected to content validation. The items attained the Content Validity Ratio (CVR) value of 0.90. The draft was modified considering the written and oral feedback of the experts. The content of the final version was further assessed by thesis supervisor. After content

validation 6 items are removed and modified 4 items. So the total number of items after content validation is 45.

In Face validity the questionnaire was submitted to 30 experts, in order to have a better validation process. The comments from the experts were considered and necessary corrections were made. Five items were removed after face validity. The items were reduced to 40 after face validity (17 in perceived oral health care needs and 23 in barriers in utilization of dental services)

While interviewing the sample we discovered that with regard to perceived needs the information collected from the sample was consistent with the literature. But in the case of barriers, there were a lot of variations from the literature. Inherent variability was also noted. So we developed the tool in two parts, one for perceived oral health care needs and other for barriers in utilization of dental services. The testing phase was done only for barriers in utilisation of dental services.

Factor analysis was done to do item reduction. The factor analysis showed significant KMO and Bertlett's test ($p<0.001$). The items loaded into five factors with eigenvalues more than one and cumulative variance of initial eigenvalues 67.16%. The internal consistency reliability was done on 23 items. The Cronbach's alpha for the scale is 0.84, Pearson's correlation (r) = 0.90 of test-retest. we finalized the 17-item questionnaire in barriers in utilisation of dental services and 7 items in perceived oral health care needs, scored on a four-point Likert type rating scale to assess the "barriers in utilisation of dental services" among older people and perceived oral health care need by likert scale of choice. We used the questionnaire to assess the perceived oral health care needs and barriers in utilisation of dental services among a sample of 399 older people within Kollam district of Kerala. In addition to needs and barriers in utilisation of services, we also assessed their socio-demographic characteristics.

Phase II

Socio demographic characters of the study population

Majority (76.2%) of the participants belongs to the age group 60-69.Ninety two percentage of the participants were reported to be as married. Forty percentage had completed matriculation. Thirty eight percent of the study participants are unemployed and thirty two percent participants are unskilled labourers. Fifty two percent of the participants belongs to below poverty line category. Sixty eight percent had reported to have systematic diseases and this

data is validated with the medical records. Sixty two percent of study participants are consulting a doctor for treatment of systemic diseases. Sixty four percent people are taking medicines for systemic diseases

Perceived oral health care needs and barriers in utilisation of dental services.

Perceived oral health care needs were present for 96.7% of study participants. Thirty three percent of the participant had a history of dental visit in the past one year. Sixty one percent of the people had visited a dentist to extract their teeth. Fifty one percent of the participant had visited a private hospital for dental care. Forty two percent people had reported that accessibility as a major reason for visiting a particular hospital.

The prevalence of perceived oral health care needs reported by the participants were loose tooth 127(31.8%), followed by missing teeth 119(29.8%), dental pain 96(24.1%) and the least reported oral disease is oral ulcers 1(0.3%).

The questionnaire on barriers in utilisation of dental services were divided into 2 domains. They are personal barriers of the older people and barriers associated with dentist and dental treatment. The responses of the participants were recorded and ranked based on the barriers they faced. The main barrier that prevented people from taking oral health care was their adaptation to the present health situation (*I don't need treatment for all the dental problems because I am able to manage with other existing teeth*) 343(86%), followed by *dental treatment is expensive* 309(77.4%) and the least reported barrier is not getting the advice from the treating physician (*I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental procedure)* 112(28.1%). The most reported barriers associated with dentist and dental treatment are people wish for *caring and friendly dentist* and *their wish for their dentist to communicate well* 327(98.7%) followed by *long waiting hours* 262(79.1%) and the least reported barrier is *lack of understanding of the scientific terms and treatment options explained by dentist* 212(64%).

Perceived need for treatment of loose teeth was significantly associated with age of the participant in bivariate analysis ($p<0.001$).Perceived need for treatment of dental caries is associated with gender (men-women) of the participants in bivariate analysis. History of dental visit had a significant association with perceived oral health care needs, in bivariate analysis.

There is a significant association ($p<0.008$) between age and the answer to the question: '*I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental*

procedure'. An association is also seen between education and the question '*I don't need treatment for all the dental problems because I am able to manage with other existing teeth* (p<0.010)'and '*I don't think I need treatment at this age* (p<0.013)'. There is an association between work and '*I don't think I need treatment at this age* (p<0.013)' and '*I think dental care is not an emergency need* (p<0.010)'.

A significant association is seen between income and '*in my opinion dental treatment is expensive* (p<0.001)', '*Diseases like diabetes, hypertension and other conditions prevent me from taking dental treatment* (p<0.010)' and '*I think dental care is not an emergency need* (p<0.020)'. history of dental visit has significant association with '*I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental procedure* (p<0.008*)', 'I don't need treatment for all the dental problems because I am able to manage with other existing teeth* (p<0.019)' and *I think dental care is not an emergency need* (p<0.031).

B. To assess the Normative oral health care needs of older population using available validated tool.

The mean DMFT was 8.78 (SD 8.38). The major portion, of the caries experience was missing teeth with mean 7.39± 8.55, while decay and filled teeth accounted for 1.30 ± 1.96 and 0.12±0.65, respectively. The results show 377(94.5%) people with natural teeth. The number of people with untreated dental caries is 198(5.5%). There are 273 (68.4%) people with healthy periodontal condition. The number of people with gingival bleeding is182 (45.6%) and 91 (22.9%) people had periodontal pocket during examination. There are 10(2.5%) percentage of people with partial denture in the upper arch and 16(4%) percentage of people with partial denture in lower arch.

The bivariate analyse showed no significant association between clinically assessed need or normative need and work, education and marital status. However, there was significant association between (p<0.02) age and dental caries. There was significant association of income with clinically assessed need (p<0.05). There is no signification association found between last dental visit and dental caries, gingivitis and sensitivity. But an association was found between last dental visit and missing teeth (p<0.00).

C. To estimate or assess the gap between normative oral health care needs and perceived oral health care needs.

Of the 90 people who reported tooth decay, only 60 (66.7%) had true dental caries and 30 (33.3%) had wrongly perceived the need for treatment for tooth decay which was not clinically present; of 309 people who reported that they do not have tooth decay 171 (55.3%) were truly free of tooth decay but 138(44.7%) who had dental caries did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed tooth decay.

The perceived need for treatment of gum diseases versus clinically diagnosed gingivitis showed that Of the 25 people who reported gum diseases, only 12 (48%) had true gingivitis while 13 (52%) had wrongly perceived the need for treatment for gingivitis which was not clinically present; of 374 people who reported that they do not have bleeding gums 204 (54.5%) were truly free of clinically diagnosed gingivitis but 170(45.5%) who had bleeding gums did not perceive the need for treatment.

The perceived need for treatment of loose tooth versus clinically diagnosed periodontitis showed Of the 127 patients who reported loose teeth, only 82 (64.6%) had clinically diagnosed periodontitis while 45 (35.4%) had wrongly perceived the need for treatment for periodontitis which was not clinically present; of 272 people who reported that they do not have loose teeth 228 (83.8%) were truly free of clinically diagnosed periodontitis but 44(16.2%) who had periodontitis did not perceive the need for treatment.

The perceived need for treatment of teeth sensitivity versus clinically diagnosed wasting disease showed Of the 54 people who reported teeth sensitivity, only 30 (55.6%) had clinically diagnosed wasting disease while 24(44.4%) had wrongly perceived the need for treatment for wasting disease which was not clinically present; of 345 people who reported that they do not have bleeding gums 190 (55%) were truly free of clinically diagnosed wasting diseases but 155 (44.9%) who had teeth sensitivity did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed wasting disease.

Dental diseases	Difference between perceptions X clinical measures (%)
Dental caries	42.1
Gingivitis	45.8
Periodontitis	22.3
Wasting disease	44.8

The differences in perception of dental diseases and clinical measures show 42% for dental caries, 45.8% for gingivitis and 44.8% for wasting diseases. A lower percentage is found for periodontitis 22.3%

D. To investigate the impact of oral diseases on oral health-related quality of life (OHRQoL) using the GOHAI (Geriatric Oral Health Assessment Index) questionnaires.

The GOHAI questionnaire consisted of 12 questions with three dimensions psychosocial, physical and pain/discomfort. The frequency and distribution of all items in the physical dimension describes that 40% of all the respondents always or often limited the kind or amount of food they eat because of problems with their teeth or dentures (item 1), forty per cent of the respondents sometimes/seldom had trouble biting or chewing different kinds of food, such as firm meat or apple (item 2), 44% of respondents always /often were able to swallow comfortably (item 3), forty seven per cent of the respondent always/often their teeth or dentures prevented them from speaking the way you wanted (item 4).

In the psychosocial dimension forty seven per cent sometimes/seldom responded that their teeth or dentures prevented them from speaking the way they wanted (item 6), 41% responded sometimes/seldom that they were pleased or happy with the looks of their teeth and gums or dentures (item 7), 48.9% ,52.5% and 54% had responded that sometimes/seldom they were worried or concerned about the problems with their teeth, gums or dentures (item 9), they feel nervous or self- conscious because of the problem with their teeth, gums or dentures (item 10) and they were feeling uncomfortable eating in front of people because of problems with their teeth or dentures (item 11) respectively.

In the pain/discomfort dimension 44.5% of respondents always/often were able to eat anything without feeling discomfort (item 5), 51.7% of the respondent sometimes/seldom were using medication to relieve pain or discomfort from around their mouth (item 8) and 53.8% of respondents sometimes/seldom they were sensitive to hot, cold or sweet food (item 12).

The mean for physical dimension in people with dental caries was 1.82±0.4 and in non-carious was 1.83±0.5. The mean for psychosocial dimension among people with dental caries was 1.91±0.4 and among non-carious was 1.87±0.3. The mean for pain/discomfort among caries subjects was 1.64±0.3 and among non-carious was 1.74±0.4. There was a significant association between pain/discomfort dimension and dental caries.

The mean for psychosocial dimension among people with gingivitis was 1.88±0.3 and among people without gingivitis was 1.89±0.4. The mean for pain/discomfort among people with gingivitis was 1.62±0.3 and among people without gingivitis was 1.76±0.4. The mean for physical dimension in people with gingivitis was 1.91±0.4 and in people without gingivitis was 1.77±0.5. An association was found between pain ($p<0.001$) and physical dimensions ($p<0.006$).

The mean for physical dimension in people with missing teeth was 1.78±0.4 and in people without missing teeth were 2.04±0.5. The mean for psychosocial dimension among people with missing teeth was 1.86±0.4 and among people without missing teeth were 2.01±0.3. The mean for pain/discomfort among people with missing teeth was 1.69±0.3 and among people without missing teeth were 1.71±0.3. An association was found between psychosocial ($p<0.008$) and physical dimensions ($p<0.000$) and missing teeth.

The mean for pain/discomfort among people with dentures was 1.92±0.4 and among people without dentures was 1.68±0.4. The mean for physical dimension in people with dentures was 1.70±0.3 and in people without dentures were 1.84±0.5. The mean for psychosocial dimension among people with dentures was 1.82±0.4 and among people without dentures were 1.89±0.4. An association was found between) and physical dimensions ($p<0.02$) and denture wear.

The mean for physical dimension in periodontitis was 1.62±0.4 and in people without periodontitis were 1.93±0.4. The mean for psychosocial dimension among people with periodontitis were 1.80±0.3 and among people without periodontitis were 1.93±0.4. The mean for pain/discomfort among people with periodontitis were 1.73±0.3 and among people without periodontitis were 1.68±0.3. An association was found between psychosocial ($p<0.007$) and physical dimensions ($p<0.000$) and periodontitis.

The mean for psychosocial dimension among people with true positive was 1.89±0.4 and among people without true positive were 1.88±0.4. The mean for physical dimension in people with sensitive teeth was 1.88±0.4 and in people without sensitive teeth were 1.79±0.4. The mean for pain/discomfort among people with sensitive teeth was 1.61±0.5 and among people without sensitive teeth was 1.77±0.4. An association was found between pain dimension ($p<0.000$) and teeth true positive.

6. Discussion

This study is one of the first to examine through primary research, the perceived oral health care needs and barriers in utilisation of dental services. The use of a sequential mixed methods approach helped us capture the nuances of the broad research problem and is one of the main strengths of the study.

This study was to develop and validate a questionnaire for measuring perceived oral health care needs and barriers in utilisation of dental services among older people with relevance to India. To best of our knowledge there are only few studies that assessed the perceived oral health care needs and the barriers in utilisation of dental services in India. With the epidemiological transition, the older population had increased in number at a higher rate. According to Population Census 2011 there are nearly 104 million elderly persons aged 60 years or above in India. As the population increases the burden of communicable as well as non-communicable diseases in older people increases. Most recent researchers emphasize on inequities on health of older people, health care needs, oral diseases and systemic diseases faced by older people[16,17,18].

According to literature[19] perceived oral health care needs are strongly associated with utilization of dental health care services. Thus, an understanding of people's need perceptions is important for effective planning and implementation of dental services. We developed and tested two questionnaires to measure perceived oral health needs and barriers in utilisation of dental services in older population. It focused on perceived oral health care needs, Last dental visit, personal barriers of older people and barriers associated with dentist and dental treatment.

The newly developed questionnaire on perceived oral health care needs and barriers in utilisation of dental services was intended to measure the same in older population. It was developed through review of the literature and qualitative exploration of the construct of "barriers in utilisation of dental services". The study demonstrated the multidimensionality of the concept. This corresponds with the findings of previous studies[22,26].

While interviewing the sample we discovered that with regard to perceived needs the information collected from the sample was consistent with the literature. But in the case of barriers, there were a lot of variations from the literature. So we developed the tool in two parts, one for perceived oral health care needs and other for barriers in utilization of dental services.

The participants' ideas of "barriers in utilisation of dental services" were closely related to the literature on barriers in utilisation of dental services and the theories on the subject[15,16]. Importantly, according to literature, barriers in utilisation of dental services has 4 domains availability, accessibility, affordability and acceptability. After conducting interview we had found that barriers in utilisation of dental services had two components: personal barriers associated with the person and barriers pertaining to dentist and dental care. The information the in depth interviews emphasise the various kinds of barriers faced by people in accessing dental care. However, due to the limitation of time, we were unable to fully explore the concept. We were only able to touch the surface of this complex construct. Judging by the in-depth interviews, it appeared that "barriers in utilisation of dental services" is closely linked with perceived need of the people.

In this study, we identified five domains of the construct of "barriers in utilisation of dental services": pertaining to the dental professional, pertaining to the general health of elderly, personal constraints, attitude towards dental care and fear of dental care and adaptation to dental diseases. The domains obtained are different from those identified by previous studies.

Adaptation to the condition was not identified as a major domain in this scale, but it was present in item 5("I don't need treatment for all the dental problems because I am able to manage with other existing teeth"). In previous studies, "affordability" and "accessibility" have been found to be an important barrier in utilisation of dental services[15]. However, many domains are found in previous studies which are not relevant to this questionnaire. The newly developed questionnaire on perceived oral health care needs and barriers in utilisation of dental services is unique to a Kerala context and it differs from other scales measuring the same.

The clinically assessed oral health care need or normative need showed a high prevalence of dental diseases among older people. The percentage of people who perceived the need for dental diseases were high but the number of people who utilised dental services in the past one year was 33%. The unmet need for dental caries, periodontal diseases, missing teeth and need for dentures were high, the main reason for non-utilisation of services is due to the barriers that exists among them.

The gap between the perceived oral health care needs for tooth decay, gum diseases, loose teeth, sensitivity and clinically diagnosed oral diseases, which accords with previous studies[27,28]. Periodontal conditions like gingival inflammation and severity of periodontitis were more difficult to self-assess. There was a tendency to overestimate the number of teeth of

decayed teeth in the study subjects. The reason why older people had a greater margin of error may have several reasons. Those who were in the older group had more decayed and missing teeth which would be difficult to distinguish from other teeth. The margin of error would have been less if people could easily identify the number of decayed teeth. Another reason is that older people have lost more teeth as a natural part of ageing and could have extracted due to dental caries or periodontitis. Some of the participants stated that they did not know about all the oral health problems that affects them. However, the question was asked as their perceived need for dental treatment were given multiple options not as an open ended question, the answers still had disparity.

The quality of life among people who had dental diseases were low. Significant association was seen between pain domain and dental caries, while missing teeth showed a significant relationship with missing teeth. The quality of life with low dental diseases had a better quality of life than people with high dental diseases. The data obtained from the present study may serve as a reference point for comparisons of the magnitude of quality-of-life indicators relating to oral health.

7. Conclusion

Dental service utilization among study participants were low, and was influenced by some demographic and socioeconomic factors. Because the gaps exist between normative need and perceived need, which clearly indicates a lack of dental literacy among these populations, for which programs should be planned in order to improve the utilisation of dental services. Enhancement in oral health care utilization in this population will broadly depend on the overall socioeconomic development, as well as on the improvements in the oral health care service delivery system, which should incorporate the needs of underprivileged populations.

8. Reference

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Chapter I
INTRODUCTION

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1.0. The aging population- a rising concern

The famous Roman poet Ausonius said about old age: "*Let us never know what old age is. Let us know the happiness time brings, not count the years*(Ausonius). This quote shows a positive attitude toward ageing. Growing old is truly a gift. A person knows how precious time is and will feel a desire to use it wisely. A person can display enthusiastic interest in leisure activities, and volunteerism can promote good personal health. As a person ages the valuable ingredient that accompanies is wisdom. The respected older person processes an intuitive knowledge of how to judge a situation and make necessary and most appropriate decisions based on their life experiences (Vital Ageing Network). So, to impart a positive attitude to older people, WHO had emphasized 'active ageing.' Active ageing is the process of optimizing opportunities for health, participation, and security to enhance the quality of life as a people age (WHO active aging 2012). Active ageing helps people to understand their potential for physical, social, and mental well-being throughout their life and to actively participate in society while providing them with adequate protection, security, and care when they need.

The ageing of a population has been defined as an increase in the proportion of the aged regarding a decrease in the proportion of the young. The world population is ageing; the proportion of the older population is increasing at a faster rate than any other age group. The ageing of a population is a consequence of the process of demographic transition. Being ahead in this process, the developed countries of the world have experienced its consequences and the developing world is well on its way to facing a similar scene. (World's older population grows dramatically,2016)

Older people are increasingly seen as contributors to the development of society, with abilities to act for the betterment of themselves and the community at large. But contradictory to that, many countries are likely to face economic and financial burdens concerning public systems of health care, pensions, and social protections for a growing older population (Ghosh, 2014), (Singh Z, 2013).

According to data from World Population Prospects: the 2019 Revision, one in six people in the world will be over age 65 (16%) by 2050, up from one in 11 in 2019 (9%). By 2050, one in four persons living in Northern America and Europe could be aged 65 or above. In 2018, persons aged 65 or above outnumbered children under five years of age globally, for the first time in history. The number of persons aged 80 years or over is projected to triple, from 143 million in 2019 to 426 million in 2050 (United Nations et al., 2019) . According to the census 2011, there are nearly 104 million older people aged 60 years and above in India. In this 53 million are females and 51 million are males. The proportion of the older population had increased from 5.6% in 1961 to 8.6% in 2011. Both the share and size of the older population is increasing day by day (census India, 2011) About 71% of the older population are residing in rural parts of the country. An important point to be noted is the dependency of the older population had increased from 10.9% to 14.2% in 2011[12]. Kerala has the maximum number of older people in the country divulge that Kerala has the highest proportion of older people in its population that is 12.6%. This is due to an improved lifestyle and better medical care (S P Sharma, 2016).

In light of an increasing number of older people government of India had announced a national policy for older people in 1999 to reaffirm the commitment to ensure the well-being of the older persons. The policy aims to provide financial, health, food, shelter, and protection of life and property for the older people and to improve their quality of life. The government is providing a social security system for people under various schemes such as provident funds,

pensions, etc. The policy had given more emphasis to women and rural poor. The policy aims to provide good and affordable health services (National policy for senior citizens, 2011).

Ageing is a natural process and an inevitable consequence of human life. Old age brings physical ailments and social problems. The major social problem of older people is their adjustment to their surrounding social world in general and their immediate families in particular. Older people face the problem of adjustment to their families and they often feel neglected and forgotten. This gives rise to sorrow, frustration, and anger leading to tension in the family. All these social issues lead to inappropriate dietary intake and poor health. Older people can be a valuable resource to the country; they can contribute to society within their families, communities as either a formal or an informal part of the workforce, or through volunteer work. In Africa and many countries of Asia, old-age people will play an important role in taking care of children. (Nesa, 2013), (Leslie and Hankey, 2015)

1.1. The normal course of aging

Ageing is associated with many changes in the body which include neurological disorders, changes in the musculoskeletal system, vision, and hearing, etc. the neurological disorders occur as the capacity of the brain to transmit signals and communication reduces. Loss of brain function is the biggest fear among older people. (Amarya et al., 2018)

Multiple neurological conditions like Parkinson's disease or the sudden damage of a stroke are also increasing with age. Parkinson's diseases and alzheimer's are the progressive neurodegenerative diseases associated with ageing. Nearly, 33 million Indians have neurological disorders, and these occur twice in rural areas (Muthane et al., 2007). According to the World Health Organisation (WHO) (World Health Organization, 2014), nearly 5% of men and 6% of women aged 60 years or above are affected with Alzheimer's-type dementia worldwide. In India, the total prevalence of dementia per 1000 older population is 33.6%, of

which vascular dementia constitutes around 39% and Alzheimer's disease constitutes approximately 54%. Stroke is another common cause of mortality worldwide (World Health Organization, 2014). However, in India, the prevalence rate of stroke among the elderly is reported to be very low compared to Western countries. A mild decline in the overall accurateness is observed in the beginning of the 60s and will progress slowly, but continuous attention is good in healthy older people. Cognitive function declines and impairments are frequently observed among older persons. Usually, these changes occur as outcomes of many distal and proximal life events, where distal events are early life experiences such as cultural, physical, and social conditions that influence the functioning and cognitive development. Normal ageing is characterized by a decrease in bone and muscle mass and an increase in adiposity (Villa-Forte A, 2015). A decline in muscle mass and a reduction in muscle strength lead to the risk of fractures, frailty, reduction in the quality of life, and loss of independence (Faulkner et al., 2007). These changes in the musculoskeletal system replicate the ageing process as well as the consequences of reduced physical activity.

Chronic diseases such as cardiovascular disease, hypertension, cancer, and diabetes are becoming the leading causes of disability and mortality among older people. Through health promotion, the prevalence of chronic disease and levels of disability in older people can be reduced and improvement in the quality of life can be observed (Ingle and Nath, 2008)

At present, most of the services available for older people are at tertiary care hospitals. Also, most of the government facilities are urban-based. A study conducted to assess the unmet health needs of the older people in rural Meerut observed that 46.3% of the study participants were unaware of the availability of any geriatric services near their residence and 96% had never used any geriatric services. About 59% stated that the nearest government facility was 3 kilometers away from their homes (P K Goel etal, 2003).

The unmet health care needs of the urban poor were assessed in a study conducted among slum dwellers of Mumbai. The participants reported a non-availability of public health care services in the slums, therefore the people have to depend on private hospitals for their treatments and the cost of treatment is not affordable for them. (Dilip and Duggal)

1.2. Oral health among older people

In most respects, population ageing is a testimony of great success in healthcare. The challenged policymakers are going to face in the coming years is dealing with the diseases of old age. Systemic diseases and oral diseases share common risk factors. Oral health of the older population is a global concern that involves a high prevalence of missing teeth, dental caries, periodontal disease, and wasting diseases. According to the World Health Organization (WHO), oral health is an integral part of general health and wellbeing, and an important determinant of quality of life (QoL). (Petersen et al., 2005.)

In general, poor oral health among older people is reflected as a high prevalence of missing teeth, dental caries, periodontal disease, teeth sensitivity, and oral cancer. The negative impact of poor oral conditions on daily life is particularly significant among older people. Extensive tooth loss reduces chewing ability and affects food choice. Poor oral health and poor general health are interrelated, mainly because of common risk factors; for example, severe periodontal disease is associated with diabetes mellitus, ischemic heart disease, and chronic respiratory disease. Tooth loss has also been linked with an increased risk of stroke. Studies done in developing countries revealed that access to oral health services is limited and teeth are often extracted because of pain or discomfort, or because of lack of materials for dental treatment.(Petersen et al., 2005)

Research had been done on various parts of the country to assess the oral health status of older people. The cross-sectional survey done by Doifode et al on 5,061 older people revealed that

dental caries (43.2%) and periodontal diseases (34.8%) were the most common dental disorders (Doifode et al., 2000). A nationwide survey conducted by Dental Council of India (DCI) on 18,233 older people from 19 states of the country, reported a prevalence of 85% and 80% among the 65–74 years old for dental caries and periodontal disease respectively (Mathur, 2003). The burden of oral diseases on older people was mentioned in multicentre studies done in various parts of rural and urban India. These studies report a high prevalence of dental caries, periodontal diseases, and missing teeth (Srivastava et al., 2013). In a study conducted among older residents in geriatric homes, reported that 86.3% and 88.0% of the subjects had no prosthesis in the upper and lower arch respectively (Shrivastav et al., 2011). A similar finding was found by Shenoy et al. in a study conducted in geriatric homes in Mangalore, reported that 88% of the subjects were fully edentulous, and only 12% had complete dentures; studies conducted among older population revealed a high burden of unmet oral health care needs (Shenoy and Hegde, 2011).

1.3. Oral health care utilisation

Studies had shown that oral health care utilization is low among older people, particularly among the socio-economically disadvantaged group due to significant barriers that exist. Previous studies suggests that there is a significant barrier to access oral health care among the older population. Dental care costs, lack of time, and lack of awareness with regards to accessibility and availability have been important barriers to the utilization of dental services among older adults(Shaheen et al., 2015). Besides cost of dental care, oral health literacy, lack of perceived need for care, and dental fear are also important factors influencing dental visits by the older population.

A study conducted in the USA, among the older people, reported that 8.5% of the population are unable to attain dental care when needed. About 3.6% of adults above 65 years reported

that dental care was an unmet need against 2.4% of unmet medical care needs(Cohen-Mansfield and Frank, 2008). Another study on older people reported that accessibility was related to the underutilization of dental services. People who had insurance such as MEDICAID used more dental care, while the income of the older people showed a negative relationship with dental care(Teresa A Dolan, 2005). A study on homebound older people in New York City showed that oral health status among them is poor. The availability of dental services at home is poor as 96% of the subjects stated that no dentist had visited them since they were homebound so they do not have access to dental care which negatively affects their quality of life (Katherine A Ornstein, 2015.). A study from brazil shows that utilization of services among older people was 17.5% and the factors contributing to the proportion of utilization that are advanced age, poor systemic health, high cost of dental treatment, long waiting times, low perception for dental needs and lack of social support (Melinda M Davis, 2010)

Moving to the African region, we can observe that health care professionals are more concentrated in urban areas. The main barrier to access to dental care was fear of HIV cross-infection and therefore, they are more concerned about the sterilization of instruments. The cost of the treatment was more concerned with males, less educated, to the divorced, separated, or widowed and to those who had previous dental treatment. The feeling of insecurity and dental injections were also a concern. Having no access to treatment and transportation problems was of least concern (because this study was conducted in the urban area). The major barrier that was worth discussion in this study was perceived needs are, they take treatment only if symptoms persist and they prioritize their systemic diseases over oral care. This article suggests that improving oral health education can change the attitude of the elderly (Ajayi and Arigbede, 2012).

In a study conducted in Johannesburg 64.3% of the respondents felt that their oral health needs are to be attended. The study also reveals that only 27.6% (i.e. less than one third) of the study population had utilized dental services in the past 1 year. The most common barrier to unmet need was "cannot afford treatment" about 52.7%. Followed by, unavailability of transport facility by 16.2% and fear of the dentist by 10.2%. The main reason for the underutilization of dental needs is because the older people do not prioritize oral health, their main concern is a systemic disease that affects their daily activity. These problems can be overcome by conducting outreach programs for the older people (Molete et al., 2014)

There are few studies done in India about perceived oral health care needs and barriers in the utilization of dental services. Goel et al conducted a study in Delhi in 2003 found that dental care was mainly given by private practicing dentists; this shows that there was a shortage of dentists in primary health care in the most rural part of India. Many elderlies go for problem-oriented treatment than going for a comprehensive or preventive treatment. Many utilises the care provided by the community dental health program. Many do not prioritize their oral health problems over other issues which is a reflection of their attitude. The reason may range from socio-demographic factors to ill health-related issues. Many elderly in the study quoted as barriers to access to dental care was their own dependent and lack of prioritizing oral health (Goel et al., 2006). A study conducted by Thakur et al have shown that socioeconomic factors influence the need for perceived dental care and that there are health inequities among lower and high socioeconomic status people (Thakur A S etal, 2012.)

A survey was conducted in the Udaipur city of Rajasthan in 2008, which examined the relationship between regularity of dental attendance and other variables like dental anxiety, oral health behaviour, socio‐economic status, and gender. The results show that, anxious people are more irregular in dental attendance than non‐anxious people. Non‐anxious who are

regular dental attendance comprises 14.7%. Education, dental socialization, regular dental attendance, socio-economic status, and interaction between education and anxiety were found to be important for the prediction of the regularity of dental attendance (Kakatkar et al., 2011).

A descriptive cross-sectional study done to determine the association between socio-demographic factors and dental services, showed that place of residence and income were significantly associated with dental service utilization as people residing in urban areas and those who are economically independent visited the dentist more often when compared with people residing in rural areas and belonging to lower socio-economic groups (Devaraj and Eswar, 2012).

A study done to identify the various barriers to avail oral health services among older people in South India showed that, there were 70% of people with unmet tooth extraction need among the participants. Age was cited as an important barrier to avail dental services even if services were given free of cost (Thomas, 2011). As age increased, the utilization of dental services decreased. Anxiety and fear of dental treatment were more common in women especially those of low-socio-economic status. (Kulkarni et al., 2009)

Many studies done in India had revealed that utilization of dental care is limited due to the lack of perceived need for care and accessibility, availability and affordability of services. (Gambhir et al., 2013) Interestingly, the economic status of the person is a major predictor affecting oral health in India. Moreover, oral health is not covered under any insurance plan. The shortage of dental services in the public sector and low availability of resources in the public sector and lack of oral health policies for older people is still a concern (Petersen et al., 2005.). Attempts should be made to improve the quality of life of the population through research, education, provision of services, and through the promotion of policies. Dental disease is a serious public health problem that affects the daily routine activity of a person. A wide gap is created between

the actual dental Needs (normative needs) of the population and the perceived need which is not mentioned in literature. Many of the studies conducted in India is mainly on utilization of dental services and fewer studies have been done on perceived need and normative need (Gherunpong, 2004)

Research has been done to assess the impact of oral health on quality of life and general health (Gherunpong, 2004). The experience of pain, problems with eating and chewing, embarrassment about the about missing, discoloured or damaged teeth can adversely affect people's daily lives, self-esteem, and well-being. The interrelationship between oral health and general health is particularly obvious among older people. Poor oral health can increase the risks for systemic diseases and with compromised chewing and eating abilities, affect nutritional intake. Similarly, systemic diseases and/or the adverse effects of their treatments can lead to increased risk of oral diseases, altered sense of taste and smell and xerostomia. The prevalence of multi-medication therapies in advanced age may further complicate the impact on oral health and oral health care (Petersen and Yamamoto, 2005)

1.4. Justification/Rationale for the study

Dental health is an indispensable part of the general health. The high prevalence and severity of oral diseases such as dental caries, periodontal disease, and missing teeth lead to a significant reduction in quality of life and productivity. The prevalence of dental caries is 84.7%, periodontal diseases are 79.4% and missing teeth is 29.3% in 2003 (Mathur, 2003.). To the best of our knowledge there are only a few studies that were attempted on older people. There were no studies done to assess the perceived oral health care needs of the older population in our country.

Several studies on perceived oral health care needs and normative oral health care needs were done in developed countries. At present there are few valid and reliable questionnaires devised for use in India. Most of the studies do not cover all the domains in perceived need assessment. In our knowledge, no study in India was done to assess the gap between perceived and normative oral health care needs among older people. Most of the studies mainly focus on the perceived impact on dental health rather than on the perceived need. Developing a questionnaire that addresses the various dimensions of perceived oral health needs among the older population was a challenge (Shah, 2005.)

Dental care is predominantly given by the private sector in our country and the cost of dental treatment is unaffordable to the people. The services provided by the public sector are only through the district hospital and teaching institutions which are few. This results in issues of accessibility and availability of services. Unfortunately, there has neither been any systematic assessment of the needs of the population nor the impact of the existing services on the oral health of the people. (Gambhir and Gupta, 2016), (Gambhir et al., 2013) There are no nation-wide data available on the utilization of dental services. However, few studies were conducted in Udaipur, Karnataka, and Haryana which showed utilization of dental services among the older population is low.

Oral health problems are a serious public health problem with universal distribution and affecting all age groups. However, only a few seek dental care. Thus a wide gap is created between the perceived needs of the population and the normative need which is quite understandable from the literature. In India, people encounter various hindrances in the utilization of dental services. These barriers can be removed by assessing the needs of the population and then motivating people to develop a positive attitude towards dental treatment (Gambhir et al., 2013)

The quality of life in older people is becoming more and more important nowadays because there is a significant increase in the number of the older population. (Atchison and Dolan, 1990). The overall health of a person doesn't mean just the absence of disease, but it should add meaning to that person's life with progressive years. Oral health-related quality of life (OHRQoL) is an important part of general health and well-being. It is recognized by WHO as an essential part of all oral health program. (Sischo and Broder, 2011). So the impact of perceived oral health needs on the quality of life of a person is not well assessed in our setting. It is important to know how perceived need and long-standing dental diseases have an impact on a person's quality of life.

1.5.Objectives

1. To develop and validate a questionnaire to measure the perceived oral health care needs and barriers in the utilization of dental services among the older population.
2. To assess the normative oral health care needs of the older population using an available validated tool.
3. To estimate or assess the gap between normative oral health care needs and perceived oral health care needs.
4. To investigate the impact of oral diseases on oral health-related quality of life (OHRQoL) using the GOHAI (Geriatric Oral Health Assessment Index) questionnaires.

1.6 The chapters: what will follow?

Chapter II Review of literature focuses on theoretical as well as operational aspects of Perceived oral health care needs among older people and the barriers in utilisation of dental services. A literature review was done to study the burden of oral diseases and the factors that influence the utilisation of dental services. The chapter further focused on discrepancy between perceived need and normative need and Oral health related quality of life.

Chapter III illustrates research materials and methods, which consists of two subsections- development and validation of perceived oral health care needs and barriers in utilisation of dental services, and cross-sectional survey. Both subsections focus on designs, methods, population, sample, tools, ethical consideration, data collection, and data analysis.

Chapter IV comprises the findings of both studies i.e. questionnaire development and validation, and cross-sectional survey for assessing the perceived oral health care needs and barriers in utilisation of dental services, normative (clinical) oral health assessment using WHO oral health assessment form -2013, to identify the gap between perceived oral health care needs and normative oral health care needs and oral health related quality of life using GOHAI questionnaire.

In chapter V, we discuss findings, strengths, limitations of this study

Chapter VI highlights the major findings of the studies and conclusions

Chapter II

REVIEW OF LITERATURE

CHAPTER 2
REVIEW OF LITERATURE

2.1 Context of method

We reviewed the relevant published and grey literature i.e. scientific articles, books, reports by governmental and non-governmental organizations on the aging population, health needs, and dental needs. Web-based searching was the main source of literature review. We used web pages of Pub-Med, Science-Direct, Google Scholar, World Health Organization, Ministry of Health and family welfare using key terms and phrases- “aging population”, “health needs”, “oral health care needs”, “perceived oral health care needs” "utilisation of dental services", "factors associated with utilisation of dental services", "quality of life", "oral health-related quality of life" and “India”. We used “perceived oral health care needs and associated factors”, “normative oral health care needs and factors associated”, “gap between perceived oral health care needs and normative oral health care needs”, “oral health problems faced by older people”, “health policy for the older people”, “barriers in the utilisation of dental services”, “dental visits and associated factors” “indices used in oral health-related quality of life assessment” and “theories of need assessment” for further reviewing the literature. This chapter provides an overview of the **perceived oral health care needs and barriers in the utilisation of dental services among older people in south Kerala.**

2.2 conceptual framework

This study focused on assessing perceived oral health care needs and barriers in the utilisation of dental services among older people in south Kerala. The critical social need theory helped to understand the concept of need by Bradshaw(Bradshaw, 1972). We wanted to explore the social construction of barriers in the utilisation of dental services among older people and the oral health care needs they perceive.

We did a review of published literature on perceived oral health care needs and barriers in the utilisation of dental services. We included needs, health needs, perceived needs, oral health needs, utilization of dental services, and barriers in the utilisation of dental services.

We reviewed various theories and models, the variables for developing the model were selected from:

1. Perceived need and normative need from Bradshaw's theory of social needs (1972)
2. Barriers to utilization of services were selected from Penchansky model (1981).
3. The predisposing factors were taken from Andersen et al (1983) generic behavioural model

This research had used three theories they are:

2.2.1The taxonomy of social needs by Bradshaw J.R.

The theory used in this study is Bradshaw's Taxonomy of social needs (Bradshaw, 1972), which divides needs into 4 categories like normative, felt or perceived, expressed, and comparative needs. Normative needs are needs defined by the professional based on their values, opinion, and experience. The felt need or perceived need is expressed as the individual's assessment of his/her health status. The expressed need is felt need converted into action and comparative need is when an individual or group is compared with a similar individual or group

and is considered lacking with regards to services or resources. This taxonomy has emphasized the perceived need and expressed need. This also leads to a greater difference between normative and other needs. This study is giving more emphasis to perceived need and normative need. These needs indicate that needs rising in one setting may be similar for people with similar socio-demographic characteristics living in another location. Bradshaw's taxonomy of need creates a definition which is more practical for health service researchers, although it does not include the concept of cost (Mohsen Asadi-Lari, Chris Packham & David Gray, 2003)

Normative need: Normative need is that which the expert defines as need in any given situation. A desirable standard is laid down and is compared with the standard that exists – if an individual or group falls short of the desired standard then they are identified as being in need. A normative definition of need is in no sense complete. It may not agree with the need established by other definitions. So, the judgment of normative need may be different according to the value given by the expert – on his judgments about the number of resources that should be devoted to meeting the need. Normative standards change in time both as a result of developments in knowledge and technology, and the changing values of society.

Perceived need: Here need is equated with want. When assessing the need for a service, the population is asked whether they feel the need. In a country like India, it could be important that perceived need would be an important component of any definition of need. Perceived need assessment is regularly used in studies of older people and community development. It is limited by the perceptions of the individual – whether they know there is a service available, as well as reluctance in many situations to confess a loss of independence.

A normative need assessment is insufficient to measure the needs of the people. So, the system should incorporate subjective assessment for a better treatment outcome. From the literature,

we had identified the gap exists between normative oral health care needs and perceived oral health care needs. To reduce these gaps/discrepancies perceived oral health care needs should be incorporated with clinical assessment. The first level of need identified is normative need assessment which is assessed by professionals. But for certain life-threatening and progressive diseases normative need assessment is the final choice and perceived need is not taken into account. For all other cases, the perceived oral health care needs should be incorporated with clinical assessment (Bradshaw, 1972).

2.2.2 The adaptation of Penchansky and Thomas's model to the utilisation of dental services

This model was developed to better define and measure access. Access is defined as the degree of fit between the user and the service; the better the fit, the better the access (Penchansky and Thomas, 1981). The model examines specific areas of fit between the client and the healthcare system. The term access is synonymously used for both accessible and available. Access can be equal access and denied access. Equal access means the guarantee of availability, supply, and resource. This approach deals with the use of a limited set of resources. While other approach states insured equal use for equal need. This approach explains that access encompasses all factors that influence the level of use in health care needs. Access influences the person's willingness or ability to enter the health care system. Denied access has five-dimensional aspects which include availability, accessibility, accommodation, affordability, and acceptability.

- Availability: refers to the available care that is there to meet the needs of a community and the relationship between the volume and type of service to client needs. It refers to

the adequacy of physicians, dentists, and other health care providers in clinics and hospitals for all services including emergency services.

- Accessibility: refers to the physical distance of a health facility to the community or the relationship between the location of the supply and location of the client. It also takes into account the travel time and cost.
- Affordability: refers to the cost of healthcare treatment, the client's ability to pay, and of traveling to the healthcare facility. It also explains the ability of the person to pay to insurance and health care cost.
- Acceptability: refers to whether healthcare facilities are appropriate to meet the needs of the community it is serving. The relationship between clients and providers and the attitude and personal behavior of both will influence acceptability. Factors like age, gender, ethnicity, and religious affiliation also influence acceptability (Saurman, 2016)
- Accommodation: refers to the ability of patients to fit into working arrangements of the healthcare facility and the relationship between how resources are supplied and organized for the clients (Molete et al., 2014)

Problems related to access influence the health system and the client. They are: when utilisation of services at entry-level is low when people are less satisfied with the system and the service they receive when there is an irregular pattern of service provided. The most important of all the reasons is the satisfaction of the client (Penchansky and Thomas, 1981). When there is less satisfaction from the client then Barriers in the utilisation of services is more.

2.2.3 Anderson's behavioural model

In the 1960s, Andersen developed a Health Care Utilization Model, to assist why families use health services, to assist in developing policies, to define and measure the equitable access to health services. At the initial state, the model focused on the family as the unit of study and

later shifted to the individual as a unit of study. The model categorizes all the causes of health care service utilization as predisposing factors, enabling factors, needs and use of health services (Andersen, 1995)

Among the predisposing factors, demographic factors such as age and gender represent biological necessities suggesting the probability that people will need health service. The health care utilization model has been modified frequently. The main goal of the behavioural model was to provide measures of access to medical care. Social structure and health beliefs are also considered as an important component in the Anderson model. It mainly deals with the ability of a person to cope with the situation and the attitudes, values, and knowledge that people have about health and health services. These factors influence the perceived need of a person. Anderson also explores the need to add genetic factors and psychological characteristics to the existing model of health behaviours (Andersen, 1995).

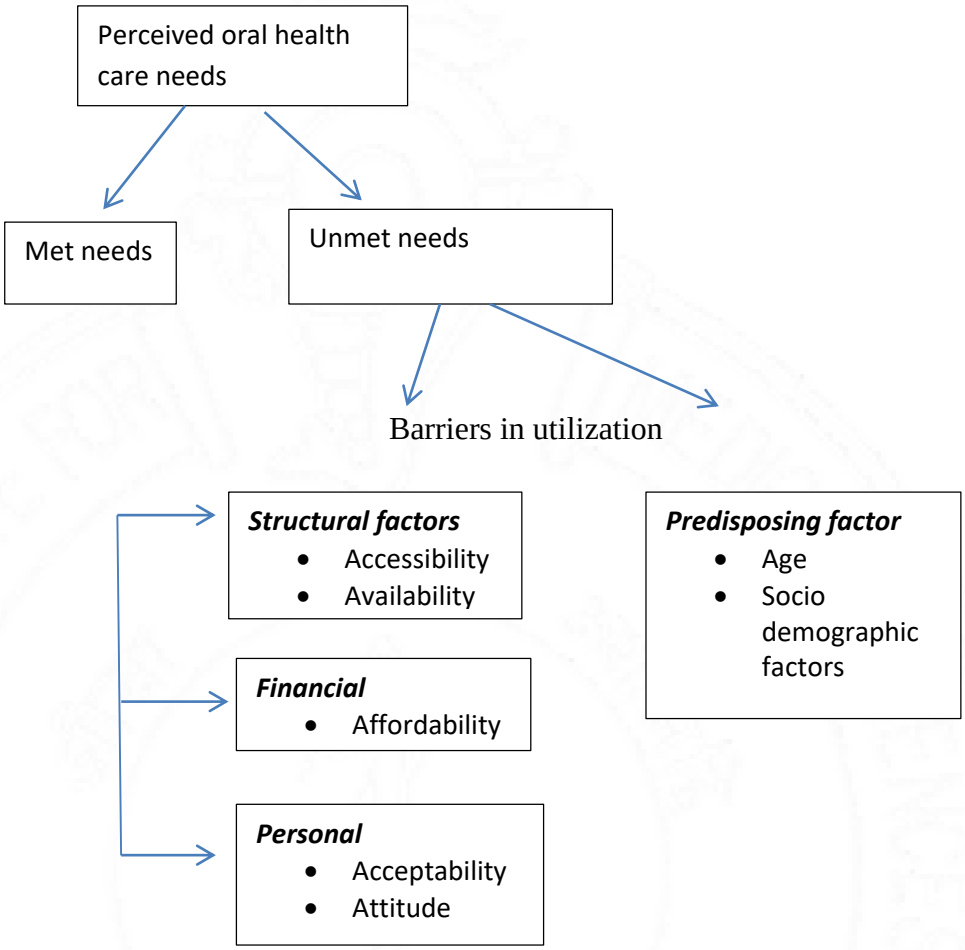
The importance of need is explained in this model. Any effort to model health services' use must consider how people view their general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of importance and magnitude to seek professional help. According to the model, the perceived need is a social phenomenon which, should be largely explained by social structure and health beliefs.

Assessed need represents expert judgment about people's health status and their need for medical care. The outcome of the behavioural model was health service use measured broadly in units of physician care, hospital and physician inpatient services, and dental care which families consumed over a year.

Reviewing various theories and models, we conclude that theories and models focus mainly on utilisation of health services, the factors that influence utilisation and their relation to the

perceived oral health care needs. The understanding of the factors that influence utilisation of dental services is most important and can lead to an increase in the utilisation dental services of older people through the creation of policies and promotion programs (Andersen, 1995).

Figure 1: schematic diagram of the conceptual framework



2.3. The concept of need

To define human nature in terms of need is to define *what we are in terms of what we lack or a difference between what is and what ought to be* (Sheiham et al., 1982). In simple words, needs can be defined as a condition that limits a person from meeting his/her potential. Defining needs is a challenging issue for the researcher. There are different theories in need. There are a wide variety of definitions of needs. All these were developed to improve the condition of the community.

Doctors, economists' sociologists, and philosophers have different views about needs. The health needs are differentiated into needs, demands, and supply which is due to the scarcity of available resources to meet these needs of the population. Need in health care is defined as the "capacity to benefit". If health needs are to be identified then an effective intervention should be available to meet these needs of the people and improve the health and quality of life. Demand is what people ask for; it is the needs that most health care providers encounter. Demand can be induced by supply: for example, geographical variation in hospital admission rates is explained more by the supply of hospital beds. Supply will depend on the interests of health care provider, the priorities of politicians and policymakers, and the amount of money available (Wright et al., 1998)

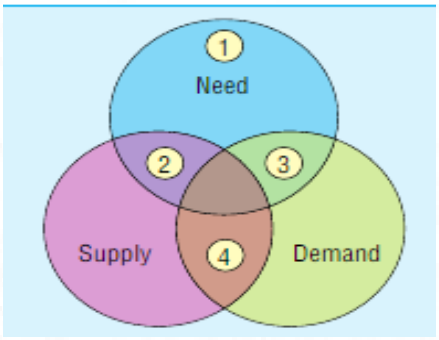


Figure 2: health needs

(source: Development and importance of health needs assessment (Wright et al., 1998))

2.3.1. Health care needs from promotion to palliation

Healthcare needs are those that can benefit from health care like health education, prevention of disease, diagnosis, treatment, and rehabilitation. Most health care providers will consider needs in terms of health care services that they can supply. Patients have a different view of what would make them healthier and happy for example, a job, a bus trip to the hospital or health centre, or decent housing, etc.

Needs addressed in the health sector are health needs and health care needs. However, most of the literature fails to distinguish between health needs and health care needs. Health need has been defined by the WHO as "objectively determined deficiencies in health that require health care from promotion to palliation" (Wright et al., 1998). Wright, Williams, and Wilkinson in their article on the 'Development and importance of health need assessment' differentiate the concept of health needs and health care needs. Health needs to incorporate the wider social and environmental determinants of health such as diet, housing, education, and employment[5]. The health needs of a population will be constantly changing, and many will not be agreeable to medical intervention. Health need assessment is gaining importance as a tool. 'Health care needs' are those that can benefit from healthcare such as health education, disease prevention, diagnosis, treatment, rehabilitation, and terminal care. The most health professional will consider needs in terms of healthcare services that they can supply. Patients, however, may have a different opinion of what would make them healthier. Most of the literature fails to distinguish between healthcare needs and medical care needs. However medical care need is a subset of healthcare need and refers to health care need that can be satisfied through medical or surgical care. If health needs are to be recognized then an active intervention should be available to meet the needs and improve health. There will be no benefit from an intervention that is not effective or if there are no resources available (Wright et al., 1998)

There are two approaches to needs in health care, the humanitarian view which explains some disturbances in health and wellbeing while realistic approaches explain that need can be met only when medical interventions are available at a reasonable cost.(Rhys, Wright, 1998) Need assessment is used for priority setting, resource allocation, and evaluating the health care system. Many developed countries use need assessment as a means of setting priorities equitably (Roy M Acheson,1978.).

Looking into the Philosophical view of need assessment, experts describe needs as 'instrumental' or fundamental to the accomplishment of a desirable goal. Baldwin proposed a theoretical definition of need, which is a 'tension need' and ‘teleological need’. While tension need implies a desire to compensate for some dis-equilibrium and teleological need reflecting the gap between actual need and desired status such as a desire for bypass surgery to improve quality of life. This approach to need also considers whether the need is effective and how effective it is and for whom it is effective (Asadi-Lari et al., 2003)

In Pragmatic view of need, Green and Kreuter defined need as 'whatever is required for health or comfort' like improving personal, social, and environmental conditions, including family planning information, smoke-free zones, and seat belt rules. The drawback of these approaches is that they are not cost-effective. Doyal and Gough suggested perceived need and autonomy are universal needs and basic human rights (Asadi-Lari et al., 2003)

The definition of need by an economist is that 'the ability of people to benefit from health care provision' it can be also explained as the ‘capacity to benefit from a particular healthcare service’. The Economist focuses on the Cost containment, therefore combining satisfactory services with cost-effectiveness provides a solution to health care rationing issues. Economist thinks that need may exist if there is an effective treatment or a health gain.(Stevens and Gillam, 1998) Many factors influence the ability to benefit from health care which includes

epidemiological aspects like incidence and prevalence of disease and the effectiveness of interventions (Asadi-Lari et al., 2003)

Physical, physiological, and social benefits may be identified in individuals or communities. The benefits of health care can be determined as an improvement in clinical status, reassurance, supportive care, and relief of carers. The economist view on 'capacity to benefit' also thinks that benefit from healthcare may be affected inversely by the severity of the disease. For example, young adults who suffer from mild symptoms of coronary artery disease may have a greater chance of being offered bypass surgery than an older patient with the same disease, whose life expectancy may not be extended greatly by surgery, on the grounds of having less capacity to benefit (Asadi-Lari et al., 2003), (Wright et al., 1998)

Furthermore, equity in access to healthcare is fundamental to the economists' definition, otherwise, it might not be equitable. Health needs are complex interactions between individual behaviour, social circumstances, cultural beliefs, and genetic construction. Therefore, individuals who have more 'capacity' to improve their health status or prevent deterioration might benefit more from healthcare (Roy M Acheson, 1978), (Hou F, Chen J, 2002)

The health needs of the people can vary from care to cure (Sheiham et al., 1982). Individual assessment of people coming out from a consultation room may not represent the wider needs of the community. When people feel that the health system cannot help with their problems like multiple sclerosis then they won't go to the hospital to take care and their needs remain unattended. Meanwhile, people who need treatment but can't demand like the homeless and people with mental illness. Distinguishing between the needs of the individual and the wider needs of the community is important in the planning of health services (Wright et al., 1998),

The health system had developed a systematic approach to clinical assessment through professional training and clinical experiences. But these methods are often inadequate to

measure the health needs of the population. The resources available in the health care system are limited and many people have inequitable access to adequate health care, many governments are unable to provide such care universally. The availability of resources is inversely related to the needs of the population. Thus, the concept of need is gaining importance nowadays; many studies are focusing on the needs of the population (Asadi-Lari et al., 2003)

The need should be considered as the expertise of the health professions, and the resources should be available at the local level. Identifying the need is a joint responsibility of the health profession and its people which includes patients and their relatives. 'All' need is partitioned into strata based on whether or not need has been perceived; and secondly, based on whether, if perceived, it has been met. Services will be directed towards preventive, curative, and caring services. If an unmet need is to be met, unperceived need to be identified, and new curative and preventive procedures identified, it is necessary to set aside resources and develop resource equivalents for these purposes (Roy M Achenson, 1978)

2.3.2. Health need assessment

Health need assessment is defined as a systemic method of identifying unmet health and health care needs of people and making changes to meet these needs. The health needs assessment is an objective and valid method of measuring health services. This is an evidence-based approach to planning health services. The purpose of needs assessment in health care is to gather the information required to bring about change beneficial to the health of the population (Wright et al., 1998), (Rhys, Wright, 1998), (Stevens and Gillam, 1998), (Hou F, Chen J, 2002).

The health need assessment had become important because the costs of health care are rising. In developing countries, over the past years expenditure on health care has risen much faster than other sectors of the economy. Medical advances and demographic changes influence the increasing cost (Wright et al., 1998). The resources available for health care are limited in many

countries. Many people have inequitable access to satisfactory health care, and many governments are unable to provide such care generally. There is inequitable access to adequate health care for the disadvantaged population, and governments are unable to provide such care. Moreover, there is a large variation in the availability of services. Availability is inversely related to the need of the population.(Wright et al., 1998), (Rhys, Wright, 1998). People are more concerned about the quality of service they receive- from accessibility to equity, which leads to a new phenomenon called consumerism.

Health authorities should undertake “equity audits” to determine whether healthcare resources are being used by need. Health needs assessment at the primary care level has been done through strategic planning and development of health services. The purpose of needs assessment in health care is to gather the information required to bring about change beneficial to the health of the population (J R Wilkinson, S A Murray, 1998).

Although health needs assessments have conventionally been undertaken by public health professionals looking at their local population, these local health needs should be paramount to all health workers. Hospitals and primary health care workers should both aim to develop services to match the needs of their local populations. Combining population needs assessment with personal knowledge of patients' needs may help to meet the goal (J Jordan et al, 1998).

Assessment of health needs is not simply a process of listening to patients or counting on personal experience. It is a systematic method of identifying unmet health and healthcare needs of a population and making changes to meet those needs. Need assessment involves various methods like epidemiological and qualitative approaches to determine priorities. The approach used must balance clinical, ethical, and economic considerations of need (Wright et al., 1998)

Unmet healthcare needs can be due to limited availability or unavailability of health care services when they are required or may be due to accessibility or acceptability problems which

include treatment costs, transportation, attitude towards and knowledge about health care. (OECD and European Union, 2016). Unmet healthcare needs in a way to measure whether there is equity of access to health care for all people and the problems that people report while they are obtaining care significantly reflects barriers to health care

It is concluded from the literature that needs should be defined concerning the procedures available to meet it and the resources that permit those procedures to be used. The procedures include the whole extent of prevention and screening of diseases, cure, and care as part of treatment, research, and development. The ethical issues raised will stretch beyond the limits of medicine and is a concern for patients and the general public. To define a need by the health professional or general public it is necessary to understand the underlying issues

2.4. Oral health care needs

Oral health can be defined as the physical, psychological, and social wellbeing and improvement of oral health-related quality of life concerning dental status. However, conventional clinical methods are used to assess the needs of the people, which is based on a disease-oriented model (Gherunpong, 2004).

Good oral health is more than having good teeth; Oral health is integral and essential to general health and wellbeing. It implies free from oral diseases, disorders, and pain. Oral health is a determining factor of quality of life. Oral diseases restrict daily routine activities causing loss of work each year the world over. Furthermore, the psychosocial impact of these diseases often diminishes the quality of life.(Petersen et al., 2005.)

WHO emphasized that despite improvements in the oral health of populations in several countries, global oral health problems persist. This is seen among underprivileged groups in both developing and developed countries. Oral diseases such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, and oral cancers are major public health problems

worldwide.(Petersen et al., 2005). Oral problems are emerging as one of the main public health concerns in India also. Oral problems cause pain, agony, functional, and aesthetic issues but also leads to the loss of working man-hours. Hence, in the long run, they are bound to have a significant impact on our economy. The interrelationship between oral and general health is proven by fact. Periodontitis is associated with type II diabetes. The strong correlation between numerous oral diseases and non-communicable diseases is primarily a result of the common risk factors. Many systemic diseases have oral manifestations that increase the risk of oral disease which, in turn, is a risk factor for several general health conditions. The most prevalent oral diseases are dental caries and periodontitis(Petersen and Yamamoto, 2005). Even though dental diseases are not an important cause of mortality, these may adversely affect the general health of people, especially in older people. Poor oral health and untreated dental diseases can have a significant impact on the quality of life, and increase the risk of other chronic ailments such as cardiovascular diseases among older people. Poor oral health leads to poor nutrition, and both these factors create a vicious cycle, which may lead to the overall deterioration of health. (Petersen et al., 2005)

Regardless of all the preventive and promotional activities on oral health, the prevalence of dental diseases among people is high globally, problems remain in many communities around the world - particularly among underprivileged groups in both developed and developing countries. Dental caries and periodontal diseases are considered the most significant global burden of oral health from historic times. (Adulyanon, 2011), (Gambhir et al., 2013)

The distribution of dental diseases varies in different parts of the world. The significant role of social and environmental factors in dental diseases and health is explained in a large number of surveys. The Global Burden of Disease Study 2016 estimated that oral diseases affected half of the world's population (Petersen et al, 2003). Dental caries is a major oral health problem in most of the developed countries, affecting more than 60-90% of schoolchildren and a large

majority of adults. It is also the more prevalent in several Asian and Latin American countries, while it appears to be less common and less severe in most African countries. In light of changing living conditions, however, it is expected that the incidence and prevalence of dental caries will increase in many developing countries, particularly as a result of the growing consumption of sugars and insufficient exposure to fluorides. (Petersen et al., 2005), (Petersen and Yamamoto, 2005)

The majority of the epidemiological studies on dental caries is held region wise. The index that measures the number of permanent decayed, missing and filled teeth (DMFT) is the common outcome for most of the studies. The average DMFT index was 2.11 (± 1.32) worldwide (Moreira, 2012). The DMFT index in South-East Asian countries showed an average of 1.95 (± 1.24) and a median of 1.65. The prevalence of dental caries in children aged 5 years was 50%; 12-year-olds was 52.5%; 15-year-olds was 61.4%; 35-44-year-olds was 79.2%, and 65-74-year-olds was 84.7%. There are many studies done in India on the distribution and severity of dental caries among older people. The study done by the dental council of India in 2003 had reported an average DMFT score of 14.9. In a multi-centre study conducted by WHO in 2007, the mean DMFT score was 5.3. (Gambhir and Gupta, 2016), (Mathur, 2004), (Saunders and Meyerowitz, 2005). The prevalence of dental caries among adults is high as the disease affects nearly the majority of the population in many industrialized countries.

Tooth loss in adults may also be attributable to poor periodontal health. Severe periodontitis, which may result in tooth loss, is found in 5–20% of most adult populations worldwide and in India, an increasing trend in the prevalence of periodontal disease was found in age 12 and above. In children aged 12 years and above, the prevalence was 55.4% while the prevalence peaked at 89 % in the 35–44-year age group. The prevalence was lower in 65-74 year age group (79.3 percent), possibly due to the presence of a high number of edentulous or partially edentulous subjects in the age group (Mathur, 2004). The data available from the various

sources indicate that symptoms of periodontal disease are highly prevalent among adults all over the globe. Furthermore, most children and adolescents globally shows signs of gingivitis. Periodontal disease is one of the major dental diseases that affect populations worldwide at high prevalence rates. Periodontal disease contributes greatly to the global burden of oral disease, however, limited attention has been given to the periodontal disease in most countries by the population at large, oral health care providers, and policymakers. (Petersen and Ogawa, 2005)

In many developing countries, access to oral health services is inadequate, and teeth are often left untreated or are extracted because of pain or discomfort. Globally, teeth lose is seen by many people as a natural consequence of aging. While in some developed countries there has been a positive drift of reduction in tooth loss among adults in latest years, the proportion of edentulous adults aged 60 years and older is still high in several countries.(Petersen et al., 2005)

There are only limited studies done on oral mucosal diseases at the global level. Leukoplakia and erythroplakia are the most frequent form of oral pre-cancerous lesions/condition. Leukoplakia appears as a white patch in the oral cavity that cannot be rubbed off, typically in the oral mucosa, tongue, and floor of the mouth while erythroplakia appears as red patches and are less common. In India, the prevalence of oral mucosal lesions was 10 percent (65-74 years) subjects. In the adult population of Kerala, the prevalence of oral precancerous lesions is 4.4%. The risk factors associated are the use of tobacco followed by alcohol and spicy foods (George B et al, 2019).

The prevalence of oral cancer is high among men and it is the eighth most common cancer worldwide. In many countries, incidences for oral cancer vary in males from 1 to 10 cases per 100 000 population. In Asia, cancer of the oral cavity ranks among the three most common types of cancer. Consumption of tobacco products (smoking, and smokeless form) had increased in recent years. Hence, oral pre-cancerous lesions and cancers are emerging as a

major risk to people and are increasing at an alarming rate in India (RS Gambhir and T Gupta, 2016)

2.5. Utilisation of services

The utilization of health care is multi-dimensional (Sumitra Ghosh). Many factors contribute to health care utilization. One of the major factors to be discussed is health coverage provided by various countries. To reduce the inequity in access to health care and increase the utilization of health services, the effort has been made by many countries, especially low- and middle-income countries. In China inequity has been reduced to an extent by increasing the insurance coverage and primary health care. Meanwhile, Chile has given 'health guarantee' to its entire citizen which covers the majority of diseases. Thailand has adopted universal health coverage (Ghosh, 2014). The country has a remarkable improvement in out-patient care also. Most of the OECD countries have achieved universal coverage of health care long back. This includes consultation, tests, examination, and surgical procedures (OECD, 2017). Generally dental and pharmaceutical drugs are partially covered under this scheme. In some countries, people have to purchase this service separately. Compulsory private health insurance to cover some or all of the population is used in countries like Switzerland and the Netherlands. In the United States, health care is covered by private health insurers. However, the older people, the disabled and low-income people are covered under various government financial schemes (OECD, 2017), (OECD and European Union, 2016)

Basic primary health coverage covers a defined 'basket' of benefit in many countries. Additional health packages can be purchased through voluntary private insurance. The proportion of people covered by private insurance is 96%,84%, and 83% in France, the Netherlands, and Israel. The former provides complimentary insurance to cover cost-sharing whereas in the later private insurance pays for prescribed drugs and dental care. Population

covered by private insurance has increased in Denmark, Korea, Slovenia and Belgium (Ghosh, 2014).

Contrary to this, there are also countries still lagging in health care utilization. The economic crisis in Greece has a significant effect on health insurance coverage. Unemployed and low-income people find it difficult for renewing insurance policies. But certain services are provided by the government like prescribed pharmaceuticals and emergency services etc. in Poland people have to contribute to their social security insurance coverage. If they fail, they will lose their insurance coverage. The situation is not much better in Ireland as people have to pay a huge amount on non-significant user charges to access primary care. Such inequity in health coverage is seen in countries like Philippines, South Africa, Ghana, and Tanzania wherein African countries health care policies favor only the rich class of the society whereas the burden of disease is high in the low-income group (OECD, 2017)

However, the condition of India is not much better. The rise in morbidity level and the increase in chronic diseases have increased the demand for better health care options. Our country faces situations like infant mortality, malnutrition among children, anemia among women and children which are still not addressed. The health care system in the country suffers from lack of funding, poor regulatory mechanisms, wide disparity between rural and urban indicators of health, Lack of coordination between disease control and other sectors programs (Lakshminarayanan, 2011)

Studies done in various parts of the country have found that a socio-economic inequity exists in health care utilization. The reasons stated are poor quality of public health services, closed public facilities, high payments for private care. Older people are in poorer health than other populations. The population suffers from many health problems like diabetes, hypertension, COPD, musculoskeletal disorders, cardiovascular diseases, and cancer. Although mortality is

low, the morbidity is still high (Hou F, Chen J, 2002). Low utilization of health services has been found in Europe among low-income groups and women, the reason for low utilization is stated to be unaffordability which accounts for 5%. A large proportion had reported that they are having unmet dental needs than medical needs. In countries like Portugal, the unmet need for health care is 14.5% and in countries like Norway, Sweden, and Iceland the unmet health care need is around 10%. This inequity is mainly seen in low-income groups. The unmet health care needs in Canada were assessed regardless of their ability to pay and its association between socio-economic status and health care status. Here people reported that long waiting hours (23%) and unavailability of services when required (15%) inadequate care was felt for 14% and the cost was reported by 11%. (OECD, 2017), (health_glance-2011)

However, the condition of India is not much better. The rise in morbidity level and the increase in chronic diseases have increased the demand for better health care options. Our country faces situations like infant mortality, malnutrition among children, anemia among women and children which are still not addressed. The health outcome in the country trails behind Bangladesh and Sri Lanka. The health care system in the country suffers from lack of funding, poor regulatory mechanisms, a wide disparity between rural and urban indicators of health, Lack of coordination between disease control and other sectors programs (Ingle and Nath, 2008). Studies show that socio-economic inequity exists in health care utilization. The reasons stated are poor quality of public health services, closed public facilities, high payments for private care. Older people are in poorer health than the general population. The population suffers from many health problems like diabetes, hypertension, COPD, musculoskeletal disorders, cardiovascular diseases, and cancer. Although mortality is low, the morbidity is still high (Singh Z, 2013)

2.5.1. Oral health care utilisation

Utilization is the actual attendance by the people at oral health care facilities to receive care. In regions where adequate dental manpower is available, the utilization of oral health care services is low thereby widening the oral health differences across the social-economic classes (Gambhir et al., 2013). Various factors like demographic, behavioral, socioeconomic, cultural, and epidemiological, etc., contribute to people's decision to either forgo care or seek professional assistance for dental problems

Traditional treatment of dental disease is expensive; it is the fourth most expensive disease to treat in most of the industrialized countries. In industrialized countries, the burden of oral disease has been managed through the establishment of an advanced oral health care system. Some countries are providing public health services including dental care for children and disadvantaged populations (Petersen et al., 2005). There is a trend observed in industrialized countries by saving the dental expenditure for curative services and investing in preventive care whereby reducing the prevalence of dental diseases. In most developing countries, the importance given to oral health care is low. In these countries, resources are primarily allocated to emergency oral care and pain relief (Petersen et al., 2005)

In developing countries, oral health services are mostly offered at the district level hospitals of urban areas, and little importance is given for preventive services and more emphasis on curative services. Many Latin American, African, and Asian countries do not have adequate oral health professionals, and the health system mainly provides emergency and curative services. In African countries, the dentist to population ratio is approximately 1:150 000 while comparing with industrialized countries it is about 1:2000. Due to the limited availability of resources children and adults suffering from severe tooth decay, teeth are often left untreated or are extracted to relieve pain or discomfort. Public health issues associate with tooth loss and

impaired oral function are therefore expected to increase in many developing countries. (Petersen et al, 2005)

Dental diseases are a serious public health concerns with universal distribution and affecting all age groups. However, despite this universal distribution of the diseases, only a few seek dental care. Thus, a wide gap is created between the actual oral health care needs of the population and the demand for oral health care which is quite understandable from the cited literature. In India, people encounter various obstacles in the utilization of dental services. These barriers can be removed by motivating people and making them aware of the oral health problems that remove anxiety and fear so that they develop a positive attitude towards dental treatment. It is suggested that dental outreach programs like mobile dental clinics, and dental camps could be a solution to spread dental literacy and disseminate treatment. There is a need for reasonably priced, rural oral health centres in public sector to make dental care available to rural strata of the population. Unmet treatment needs of the people belonging to the lower class should be addressed during the conduction of dental programs. School-based screening and motivation programs significantly improve the percentage of children who seek free dental treatment at a dental school (Hebbal and Nagarajappa, 2005). These programs can also target the lifestyles and needs of school children.

Studies concerning the utilization of dental services by the north-east part of the Indian population are almost absent. Hence it is the responsibility of the health care sector to gather information on the utilization of dental services by people living in that part of the country. Information about people's use of dental services is useful. it can help dentists and policymakers to optimal distributions of manpower and money (Gambhir et al., 2013).

2.6. Perceived oral health care needs and normative oral health care needs

According to cooper, Need does not always lead to treatment, and treatment does not always result from need, but the need for treatment is defined by a medical practitioner. Spencer (1980) defined dental need as “the quantity of dental health care which expert opinion judges ought to be consumed over a relevant period, for people to remain or become dentally healthy based upon existing knowledge” (Spencer, 1980). The definition emphasizes on the severity of the individual's illness and the extent to which the illness exists in the population. This implies that when a dentist diagnoses a disease, a need for professionally defined better health exists and it is the responsibility of the dentist to provide treatment for them.

The Standard methods of oral health surveys are usually based on the clinical method or normative need assessment. Oral health care needs are described in terms of types and degrees of oral health problems, measures by clinical indices such as the DMFT and the CPITN. The treatment needs are directly recorded in the surveys, such as the needs of fillings, or extraction. This method of direct treatment plan approach helps the collected information in a better way. The normative assessment is subdivided into diagnostic needs, preventive needs, and disease, disability, or dysfunction-oriented needs. The normative need can also be considered saving time, cost, and manpower (Sheiham et al., 1982).

The normative need is based on the bio-medical model or disease-oriented model. Normative assessment in dental practice is assessed in terms of type and degree of dental problem, by using clinical methods. These methods are often inappropriate to measure health and treatment needs. The dentist and his patient have a different opinion of needs. Oral health care needs to be assessed by a dentist who is influenced by their theories of health and disease as well as values and norms. (Gherunpong, 2004). The dentist detects disease or abnormality and likely to consider an ideal state of health as a goal and then use a treatment plan to treat the disease.

But on the other hand, patients are concerned with signs and symptoms that disturb their daily routine activities. Patients are likely to feel that they need treatment when they perceive symptoms like severe dental pain. Some dental diseases like dental caries and periodontal diseases do not show any symptoms in their early stages (Gherunpong et al., 2006), (Watson, 2014). Therefore, wide gaps in opinion for treating oral diseases are found between the dentist and the patient. In short, it appears that the traditional normative approach to assessing oral health care needs is insufficient to use as a core basis for needs for dental health services. Sheiham & Spencer, 2002, had discussed many limitations for normative need assessment (Gherunpong et al., 2006)

They are:

1. lack of objectivity and reliability;
2. the relative neglect of quality-of-life concept;
3. the omission of health behaviours and patient compliance;

It has been widely accepted that the concept of objectivity of normative dental need assessment was much more unclear than was often supposed. Normative need assessment allows for variation among dentists and their treatment decisions. World health organizations had given suggestions about decision making in treatment and the judgment should be based on the most probable treatment for the average person in the community. Spencer had pointed out that calculating time, cost, or manpower needs tended to vary from one place to another depending on basic facilities available in the community, such as dental technology and the use of auxiliaries (Spencer, 1980). Therefore, the normative assessments were not comparable and had little objectivity and reliability. Lack of objectivity of decisions made by dentists was mentioned by many authors. Elderton stated that “treatment decisions can only be made based on what dentist ‘thinks’ he/ she finds”. Many authors agreed that dentists frequently made their

clinical decisions on diagnosis, prognosis and treatment need depending upon their knowledge, philosophies, values, and norms as well as their attitudes and practice (Elderton, 1990).

WHO has defined health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 1948). This definition high lightened the importance of well-being that is quality of life. The concept of quality of life on health is considered as a central goal in health care services. It highlights concepts of an individual's well-being or quality of life that incorporate all aspects of an individual's life, and cover the functional, psychological, and social wellbeing. Concepts of quality of life could refer to the subjective assessment of the health-related quality of life', defined as *optimum levels of mental health, physical role, and social functioning, including relationships and insights of health, fitness, life-satisfaction, and well-being.* The primary goal of treatment is not only to add years to life but to add life to years (Sischo and Broder, 2011). The traditional normative approach to estimating oral health treatment needs does not take into account the concepts of oral health-related quality of life. The burden of oral diseases refers to their negative effects on people's quality of life. Therefore, the concept of oral health-related quality of life should be the ultimate basis for oral health care. It is also noted that normative assessment measures the extent or level of dental diseases, regardless of how they affect the people's quality of life (eg: dental indices like DMFT- DECAY-MISSING-FILLED- TEETH index measuring dental caries and CPITN index measuring periodontal conditions does not consider the quality of life in their assessment). The major reason for concern among dentists is about the survival time or longevity of the treatment provided, instead of how, and if, the treatment improved the people's quality of life (Adulyanon, 2011). Dentists assumed that with an ideal state of oral conditions, people would have a better quality of life. Such assumptions appear to be false and a wide gap is seen between the normative need and quality of life. The normative assessment appears to

concern about oral health rather than people's perception of their quality of life (Gherunpong et al., 2006)

As discussed earlier, normative methods of assessing oral health treatment needs are based on clinical diagnosis. When clinically defined abnormalities are present, clinical interventions are needed to deal with the problem. The CPITN system recommends scaling when calculus is detected, and scaling with root planning for periodontal pockets (Ainamo et al., 1982).

These clinical criteria seem to be insufficient for deciding the treatment needs of the patient because they do not take into account patients' attitudes and behaviours, which have a strong influence on the effectiveness of treatments and improvement of oral health (Ab-Murat et al., 2015). The effectiveness of treatments depends not only on dentists but also on the patients. Dentist's knowledge of how to treat, manage, and control, even prevent, oral diseases must be accompanied by the cooperation of patients. Therefore, assessing treatment needs without an adequate assessment of the patient's oral health-related behaviours has important shortcomings.

2.6.1. Perceived need and its implication

Perception of health is subjective, the perceived need may reflect the actual level of health, individuals experience with the health system and the treatment received. Perceived health status has been conceptualized as a component of the overall quality of life and is associated with a variety of indicators of general health and health behaviours (Gherunpong et al., 2006). Self-perceived need for treatment partly reflects the impact that a disease has on individuals. It shows the degree of deficiencies and dysfunctions resulting from the health condition, along with individuals 'perceptions and attitudes regarding the condition. Bradshaw in his taxonomy of social needs had given more emphasis to felt need (perceived need) and expressed need.

Many factors are influencing perceived need they are socio-economic, biological, and psychological factors (Bradshaw, 1972). Helen C Gift had explained the need for dental care is mainly influenced by socio-economic status. A professional having more autonomy in their job can take some time off for dental treatment (eg: extended lunch hour etc.) (Gift et al., 1992). Most of them do have a perceived need for taking preventive care. On the other hand, individuals who delay dental visits will have a perceived need for treatment and they will be influenced by factors like limited transportation options, dependency status, long waiting time in the dental office, and cost of dental treatment. Most people of lower socioeconomic status tend to do home remedies and self-care to avoid professional care. They do not prioritize oral health care needs over other needs. Gilbert et al had said that there are predisposing factors that influence perceived need they are educational level, self-perception of health condition, and guidance given by the dental services. There are biological changes related to a perceived or felt need. The visible changes in oral health generally initiated people ‘s needs for dental care. People interpreted these changes and reported them as symptoms, which may lead to seeking dental care (Gilbert et al., 1994). The visible change in mouth or face was an important determinant of perceived oral health care needs because it affected social interactions and was central to social communications. Symptoms could make people feel threatened, being restricted in their daily activities, or not being well in some ways. These factors frequently stimulate them to perceive the needs for dental care (Martins et al., 2008). There are psychological factors that influence perceived need they are stress and individuals' perceptions, attitude, belief, and feelings. These factors influence and shape what people perceive For example, people may experience minor symptoms that occur so commonly throughout life as normal variations and be unlikely to perceive them as needs. Emotions could increase the degree of people‘s perceptions of symptoms and stimulate their needs. Some psychological factors could be considered as barriers to perceived needs. Fear and anxiety are the most

important psychological barriers to dental needs (Martins et al., 2008). Many people have an aversion to dental treatment which is due to the lack of socialization about dental care in their early years of life. The reason for high unmet need and lack of utilisation of dental services is the neglect given to dental care during their early years of life (Gunnar Ekbäck, et al., 2008). Scrambler has classified factors affecting perceived need are culture, presentation, and knowledge of the disease, cost of treatment, age, gender, and availability of services. There is a marked difference in how people from different cultural backgrounds interpret their symptoms. Culture may result in someone withdrawing when in pain and in other cultures, people may be more expressive and open about the pain experienced (Cohen-Mansfield and Frank, 2008), (Zhu et al., 2005)

While looking into the oral health care of the individual, knowing about the outlook of the person on their health is important to improve a person's adherence to healthy behavior conditions. In the case of older people, this aspect becomes more relevant because the main reason for not seeking dental service is the fact that they don't perceive a need for dental care. (Dantas Torres, 2015)

2.6.2. The gap between normative and perceived needs

Likely, health providers and patients differ widely in their opinions of need. Oral health care needs to be assessed by professionals who were influenced by their concepts of health and disease as well as their norms and values. Professionals detect diseases or abnormalities and are likely to consider as an ideal state of health and then use complete treatment plans to bring to an ideal condition. A deviation from the ideal conditions is measured by detailed investigations and diagnosis. A person is considered as requiring treatment if his/her oral tissues were damaged in any way by either pathological or traumatic causes, or differed from conditions that professionals defined.

On the other hand, people perceived need mainly with specific oral signs and symptoms that disrupt their daily routine activities, such as their appearance, inability to perform a normal function. People are likely to feel that they need treatment when they perceive acute symptoms, mostly dental pain. However, most oral diseases, such as dental caries and periodontal diseases, are unlikely to cause acute symptoms in their early stages. So, a wide gap in opinions or needs for treating dental diseases between dentists and laypeople were often found.

People's perceived needs were frequently lower than dentists' normative needs assessment (gilbert). Also, people were likely to be more satisfied with treatment outcomes than professionals, because they did not mind minor defects or remaining oral diseases while professionals did (Celebic et al., 2000).

Even though professionals realized there were gaps between their and lay people's opinions about health care, they concluded that people had less awareness or knowledge about dental health, and therefore, needed the education to increase their dental health awareness (Tervonen & Knuuttila, 1988). Professionals' judgments rarely involved people's concern, but sometimes we're also dominated by other non-clinical factors, such as medical and technical facilities, professionals' workload, the payment system, and access to auxiliaries. Thus, the normative system of treatment needs frequently misjudged the needs of patients. The literature on the gap between normative and perceived needs is extensive.

2.7. Quality of life among older people

The degree to which a person enjoys the important potentials of his/her life. Possibilities result from the opportunities and limitations each person has in his/her life and reflect the interaction of personal and environmental factors. Enjoyment has two components: the experience of satisfaction and the possession or achievement of some characteristic. The major domains are

Being, Belonging and Becoming were developed from the insights of various writers (Quality of Life Research Unit, University of Toronto).

The World Health Organization defined quality of life as an "*individual perception of his or her living situation, understood in a cultural context, value system and about the objectives, expectations, and standards of a given society*". From this perspective, health-related quality of life includes areas such as physical health, psychological state, level of independence, personal relationships, beliefs in a particular context or the natural environment, and social support.

Quality of life has emerged as an important parameter for evaluating the quality and outcome of health services. People with chronic diseases for whom quality of life has become a critical outcome measure. There are two main concepts for quality of life. The first one is increasing in life expectancy of the people leading to improvement in health care which leads to a decrease in both mortality and morbidity occurs and improvement in the quality of life as a health outcome began to gain importance. The second explanation is that with improvement in medical technologies, health care professionals began to assess the improvement in treatment with quality of life measures.

The general health is most important to a person, but we should also emphasize oral health because when neglected, it will result in a decrease in self-esteem, nutrition, and quality of life. It is essential to understand how older people perceive and evaluate their oral conditions because this perception conditions the patient to utilize dental services. Nevertheless, it's unusual for people to identify their only health issues that affect eating ability, speaking, chewing, physical appearance, and social life, frequently producing pain and favouring depression. Oral health expectations among older people could also be influenced by age, education level, socioeconomic situation, and social support.

To assess the oral health status, knowing the perspective of individuals about their health is an important prerequisite for increasing adherence to healthy behaviour. This is more important and relevant in elderly people as the main reason these individuals do not seek dental treatment

Over the past 20 years, a variety of oral health-related quality-of-life instruments have been developed, as a result of increased concern about the impact of oral conditions on a person's quality of life. The most commonly used tool being the Geriatric Oral Health Assessment Index (GOHAI) (Vd et al., 2013), (Atchison, K.A., Dolan, T.A., 1990)

GOHAI index is an important indicator of health because it expresses the individual's cultural beliefs as regards his/ her health, it also discloses that the patient analysis his/her oral health using different measures from those adopted by the dentist

2.8. Tools for measuring perceived oral health care needs and barriers in the utilisation of dental services.

Several previous studies have found the association between utilization of dental services with

Perceived oral health care needs. Most of the studies included selected components of the perceived oral health care needs i.e. visit the dentist, experience of dental problem, adverse habits (Boomireddy et al, 2016), perceived oral health care needs, oral health care service preferences (Zahra yaghoubi et al, 2017), self-perceived need (felt need), the perceived need for care (demand) (Pradeep et al, 2016), impact-related need, propensity related need (A.Sheiham and Spencer J, 2002), the perceived need for immediate problem-related need, the perceived need for an immediate dental check-up, perceived need for problem-oriented care (Anna n astrom et al, 2007), self-reported unmet dental needs, oral health care patterns, patient insurance status (Melinda m devis et al, 2010), and last dental visit, dental knowledge, dental service utilisation, dental health belief (ECM Lol et al, 2016)

We found a study that used comprehensive tools for measuring the perceived oral health care needs and barriers in the utilisation of dental services, however, this study was done on young adults and was not relevant to the Indian context (Zahra yaghoubi et al, 2017). Most questionnaires were developed considering either perceived oral health care needs or barriers in utilisation of dental visits. We found a validated questionnaire for assessing the access to health care utilisation among older people which covers dental visits, utilisation of dental services, patient satisfaction, and perceived barriers to dental care

But, it was developed to determine barriers to dental care access by an elderly population residing in Johannesburg, which was developed in the context of elderly living in urban settings (Molate et al, 2014)

From the literature review, we felt that a gap exists for contextual scales for measuring Perceived oral health care needs with relevance to the utilization of dental services among the older population in south Kerala. Therefore, we decided to develop and validate a new questionnaire of relevance to Kerala context and settings. The detailed analysis of available tools is given in the following table (Table: 1). Since perceived oral health care needs and barriers in utilization of dental services are limited to the context; we felt that the exercise of developing and testing a new questionnaire will help in adding to the better understanding by investigators about this phenomenon.

Table 1 Table showing synopsis of literature review on item pool generation

Sino	Name of author	Aim of the scale	Domains	Type of scale	Items
1	Zahra Yaghoubi, Mohammad Khajedaluee and Tayebeh MalekMohammadi	The aim of this study was to develop a comprehensive, standardized and validated questionnaire to assess perceived oral health care needs, barriers to oral health care access, and it's utility.	• Perceived oral health care needs • Barriers to oral health care access • Oral health care service preferences.	• Five point response for dental care needs. • Dichotomous response for perceived need • Numeric rating scale response from 0-10 for extend of fear and need • Multiple choice questions for dental utility.	33
2	Vikram Simha Bommireddy, Pachava, S., Ravoori, S., Sanikommu, S., Talluri, D., Vinnakota, N.R..	The aim of this study was to identify the utilization patterns of oral health care and barriers for utilization among rural population aged 55 and above in Guntur district of Andhra Pradesh.	• Visits to dentist • Experience of dental problems • Oral hygiene practices • Factors influencing utilization of oral health care services • Adverse habits.	• Dichotomous response for dental visit and experience • Multiple choice response for care sought, dental problems, treatment undergone, barriers in dental services and quality of treatment.	38

3	Pradeep Y, Kalyan K Chakravarty, Kavya Simhadri, Alexis Ghenam, Guntipalli M Naidu, Sudhakar Vundavalli.	To identify the relation between need, demand, and effective demand for dental services in Andhra Pradesh, India.	• self-perceived need for dental care (felt need) • Perceived need for care (demand) • actual dental service utilization (effective demand)	• The responses were dichotomized as "yes" or "no" answers. • The reason for not seeking dental care was an open-ended question	4
4	Shikha V, Rekha R, Radha G, Pallavi S K.	The aim to assess self-perceived and normative dental needs among teaching faculty of Visweswarapura Group of Institutions.	• Perceived need	• Three-point Likert scale (yes/no/don't know)	12
5	Gunnar Ekbäck, Anne Nordrehaug Åstrøm, Kristin Klock, Sven Ordell, Lennart Unell,	clinically-and self-perceived oral health indicators among 19-year-olds attending dental clinics in the Swedish Counties.	• Self-perceived oral health • Knowledge • Function • Quality of life • social	• Dichotomized response • Cut off point zero for caries free and greater than zero for caries.	13
6	Andréa Maria Eleutério de Barros Lima Martins, Sandhi Maria Barreto; Isabela Almeida Pordeus	To analyze factors associated with the self-perceived need for dental treatment among elderly people.	• self-perceived need for dental treatment • self-perceived oral health • objective oral health conditions	• Dichotomized response • Likert scale • Multiple choice questions.	10

7	H.C. Gift, K.A. Atchison, and T.F. Drury	To understand the association between Perceived oral health status with a variety of single clinical and self-reported indicators of oral health and oral health-related behaviors.	• Self-perceived overall oral health status • Health perceptions and orientations • Actual levels of diseases and conditions • Self-defined need for treatment.	• Five point likert scale	6
8	S. Gherunpong, G. Tsakos& A. Sheiham.	The objective of this study is to develop and test a new socio-dental system of needs assessment for overall dental needs of primary Schoolchildren.	• Normative need • Impact-related need • Propensity-related need	• Three point likert scale.	11
9	Molete, M.P., Yengopal, V., Moorman, J.D.	To determine barriers to dental care access by an elderly population residing in Johannesburg	• Utilization of dental services • Perceived barriers to dental care • Patient Satisfaction • Perceived need	• Multiple choice questions • Open ended questions • Dichotomized questions.	29

10	Anne N Åstrøm and Irene A Kida	The aim was to assess the prevalence of perceived need of problem based dental care, dental check-ups and any type of dental care	• Perceived need for immediate problem-oriented care • Perceived need for immediate dental check-up • perceived need for problem oriented care or dental check -up	• Likert scale	4
11	Bahramian H, Mohebbi SZ, Khami MR, Asadi-Lari M, Shamshiri AR, Hessari H	The aim of the survey was to investigate the association of dental service utilization with mental health measures in the context of socioeconomic status (SES) of the Iranian adult population.	• Dental service utilization • Mental health assessment	• Likert scale • Multiple choice response	9
12	Bommireddy VS, Koka, K.M., Pachava, S., Sanikommu, S., Ravoori, S., Chandu, V.C.	To know the factors determining utilization of dental services	• dental health attitudes • last dental visit • treatments underwent • Factors influencing utilization.	• Likert scale	4
13	Melinda M. Davis, Davis, M. M., Hilton, T. J., Benson, S., Schott, J., Howard, A., McGinnis, P., & Fagnan, L.	This study describes the prevalence of oral health conditions and unmet dental needs among patients presenting for routine care in a rural Oregon family medicine practice.	• Patient insurance status • oral health care patterns • Self-reported unmet dental needs.	• Multiple choice responses	12

14	E.C.M. Lol, H.C. Lin, Z.J. Wan ,M.C.M. Wong, and E. Schwarz	To describe the dental service utilization patterns of the middle-aged and the elderly Southern Chinese and the influence of various factors on the use of dental services	• Last dental visit • Dental knowledge • Dental service utilization • Dental health belief	• Likert scale • Interval scale • Multiple choice	14

2.9. Operational definitions

- **Need**: Need is a condition that limits a person from meeting his/her potential.
- **Need assessment**: It is a systematic process for addressing and determining needs or gaps between current conditions and desired conditions or wants.
- **Health**: WHO has defined health as a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity.
- **Health needs**: Objectively determined deficiencies in health that require health care from promotion to palliation.
- **Normative Need:** These are defined by professionals based upon an assessment against an agreed set of criteria.(Bradshaw 1972)
- **Perceived needs or felt needs:** The needs defined by what people think or feel about their needs.(Bradshaw 1972)
- **Dental need:** The quality of dental health care which expert opinion judges ought to be consumed over a relevant time period, in order for people to remain or become dentally healthy based upon existing knowledge.(spencer,1980)
- **Quality of life (WHOQoL 1994):** Individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships to salient features of their environment.
- **Oral health related quality of life (OHRQOL):** is defined as a multidimensional construct that reflects (among other things) people's comfort when eating, sleeping, and

engaging in social interaction; their self-esteem; and their satisfaction with respect to their oral health.

- **Older population**: Although there are commonly used definitions of old age; there is no general agreement on the age at which a person becomes old. To define older population many factors are to be considered like chronology, change in social role and change in capabilities. The most commonly agreed definition is age at which a person becomes eligible for statutory or occupational pensions. (WHO Health and Statistics information system). In India the age of retirement is 60 years and the national policy for older persons had taken age 60+ and above as older person. So, a person aged 60 and above is considered as older person in this study. (National policy for older persons 1999)
- **Classification of older population**
- Age 60-69 - They are called as the young old or not so old. They are expected to be in reasonably good physical and mental health, free of serious disability and capable of leading an active life.
- Age 70-79 – they are the mild old or old. They may vary from those being healthy and active to those managing an array of chronic diseases.
- Age 80 and above – they are the older old or very old. They tend to be physically frailer and need more attention and care. (National policy for older persons 1999)

- **Perceived oral health care needs and barriers in utilisation of dental services** can be defined as those needs that a person perceives to seek oral health care but are unable to receive care due to the barriers that exists in utilisation of oral health care services

like limited availability of oral health care services or problems with accessibility, acceptability and affordability.

- **Normative oral health care needs or oral health treatment needs** as those needs that are defined by a professional, which are influenced by the theories of disease and health as well as by their values and norms, for detecting the diseases in the oral cavity with the help of available dental aid, for the prompt diagnosis, treatment and prevention of oral diseases.

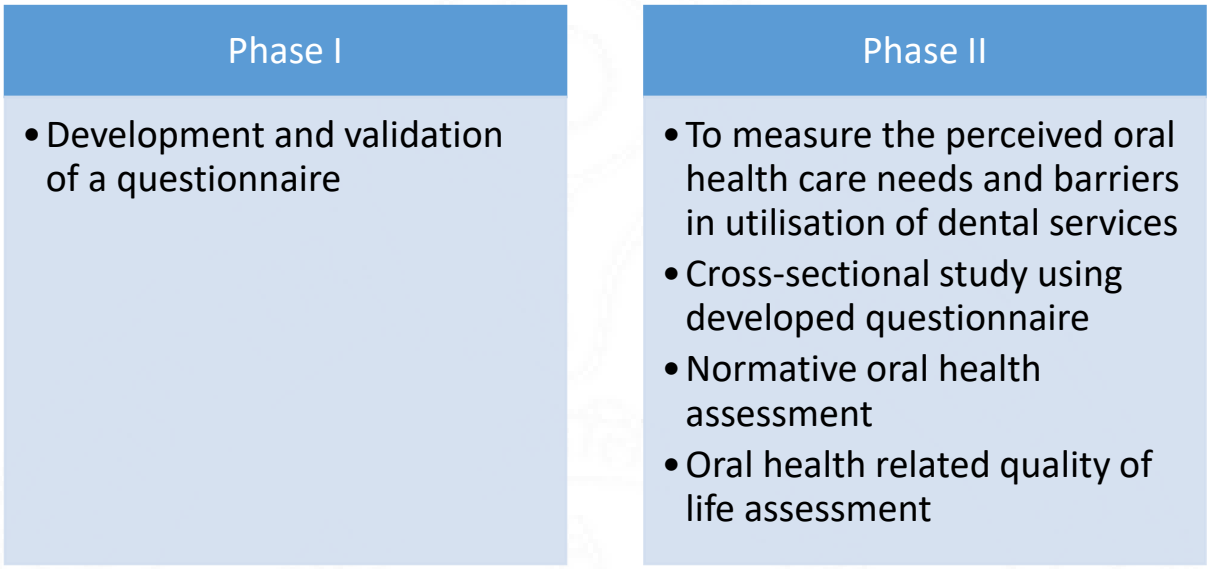
Chapter III
METHODS

Chapter III
Methods

3.0. Study design

This study is a multiphase, mixed-method study that uses both qualitative and quantitative tools.

Figure 3: The phases of the study

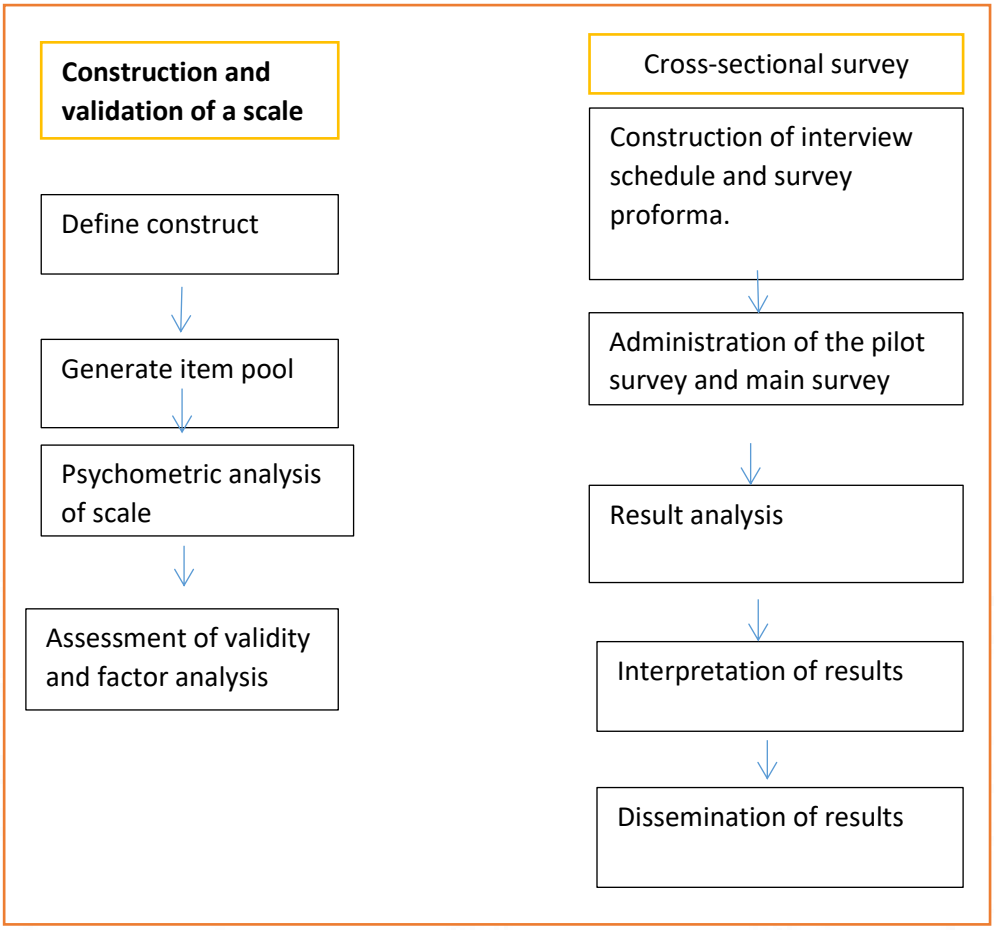


In phase I, a questionnaire was developed and validated to measure 'the perceived oral health care needs and barriers in the utilization of dental services among older population'.

In phase II, a cross-sectional survey was conducted to assess the perceived oral health care needs and barriers in the utilization of dental services by using the tool developed in phase I. The normative oral health needs (clinical) and oral health-related quality of life was also assessed in this phase.

3.1. Organization of the study

Figure 4: The two stages of the study were linked and organized as follows.



3.1.1. Study setting

The study was conducted in the Kollam district. The district is known as the oldest seaport town on the Arabian Sea. It is flanked by the Lakshadweep Sea in the west and the south and the Ashtamudi Lake on the north, on the south-west coast of India between north latitude 9°10′ and 8°45′ and the east longitude 76°25′ and 77°15′. The district is bounded on the north by Mavelikara and Karthikapally taluks of Alappuzha. The northeast border by Adoor and Kozhanchery taluks of Pathanamthitta districts, on the south by Nedumangad and Cherayilkeezhu taluks of Thiruvananthapuram district and on the west Lakshadweep sea (Census of India, 2011).

There are five taluks in Kollam district they are Karunagapally, Kunnathoor, Kollam Pathanapuram, and Kottarakkara, comprising of a total of 103 revenue villages. Under the local self-government system, the district is divided into three towns, thirteen development blocks and seventy-one Panchayats.

The district has the 3rd female favorable sex-ratio in the state. The district occupies the 8th position in literacy rate (94.09 percent) in the state and has a total population of 2,635,375 persons. The male population is 1,246,968 and female population is 1,388,407. The rural and urban population is 1,448,217 and 1,187,158 respectively. The total number of older people in the district is 350,012 persons. There are 200502 older persons in rural Kollam and 149510 older persons in urban Kollam.

Figure 5: Map of Kollam district

3.1.2. Ethical considerations

The proposed study complies with the basic ethical principles of research. The study has been conducted after getting the approval and clearance from the Institutional Ethics Committee (IEC) of Sree Chitra Tirunal Institute for Medical Sciences and Technology (appendix). Informed consent was sought from the respondents after providing the necessary information regarding the study, objectives, potential benefits, and risks of participating in the study (appendix). They were informed that the decision to participate in the study or not is entirely their prerogative. They have also been informed that they can withdraw from the study at any point. They had the freedom to ask any queries related to the study. The informed consent and participant information sheet were made available in both English and Malayalam languages. In the case of illiterate participants, thumb impression to indicate consent was taken in the presence of a witness. Privacy has been maintained in all interactions with the respondents and the confidentiality of the information has been protected under all circumstances. All information about the respondents collected as part of the study was under the safekeeping of the Principal Investigator, who was responsible for its safety.

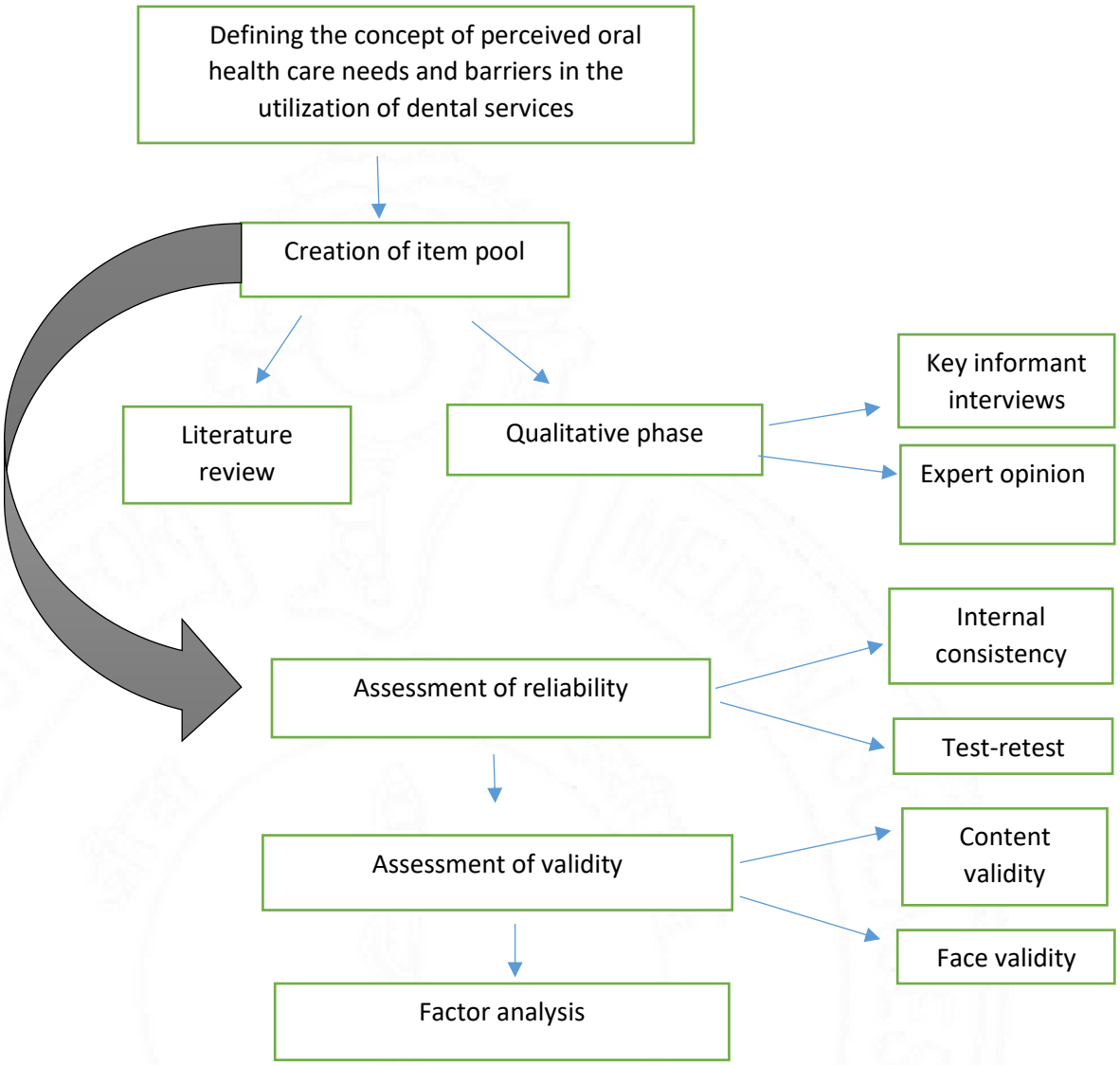
For participating in in-depth interviews, verbal consent was sought if necessary, as most of the officials and were comfortable with providing written informed consent.

Phase I

3.2. Development and validation of the questionnaire

The development and validation of a questionnaire on perceived oral health care needs and the barriers in dental service utilization were done. From the 71 Panchayats in Kollam district, we selected two Panchayats randomly using the lottery method. The selected panchayats were Anchal Panchayat and Chathanoor Panchayat. The preliminary draft of the questionnaire consisted of 30 items. Based on the ratio (1: 5) of items and respondents, we administered the scale among 150 respondents. The details of the sample and sub-samples are discussed under the scale construction and validation theme.

Figure 6: Steps in the development and validation of the questionnaire



3.2.1. Defining the concept

The first step in developing a questionnaire is to define the construct. To measure a construct there are different methods available. Questionnaire development deals with the measurement of a phenomenon that is available but cannot be observed directly (DeVellis, R. F., 1991).

Perceived need of a person is subjective, the perceived need may reflect the actual level of health. Perceived health status has been hypothesized as a component of the overall quality of life and is associated with a variety of indicators of general health and health behaviors (Gherunpong, S., 2004). Perceived need shows the degree of dysfunction and deficiency resulting from the health problems, along with person's perceptions and attitudes regarding the condition.

Utilization is not just the willingness of people to seek care but the actual attendance at the site of delivery of health care services to receive care (Bommireddy et al., 2014). There are many factors like demographic, behavioral, socioeconomic, cultural, and epidemiological that influence the utilization of dental services in India. People encounter various hindrances in the utilization of dental services. These barriers should be assessed and proper measures should be taken to improve the oral health of older people. The literature review showed a high association between perceived oral health care needs and barriers in the utilization of dental services. The main reason for developing a new questionnaire is that the previous scales were inadequate for some reason. The previous questionnaires were difficult to adapt to the Indian setting and did not cover all the domains that exist in our country (Streiner et al., 2014)

While interviewing the sample we discovered that concerning perceived needs the information collected from the sample was consistent with the literature. But in the case of barriers, there were a lot of variations from the literature. Inherent variability was also noted. So we developed the tool in two parts, one for perceived oral health care needs and barriers in the utilization of dental services.

The domain perceived oral health care needs were developed based on the outcome of dental diseases. Most people perceive a need for care based on the outcome they expect for dental diseases. The pain was the single major concern in studies as well as from the interviews. Satisfaction with appearance and function i.e., chewing ability is also a key concern for some of the older people. So, the questionnaire is developed emphasizing these three factors.

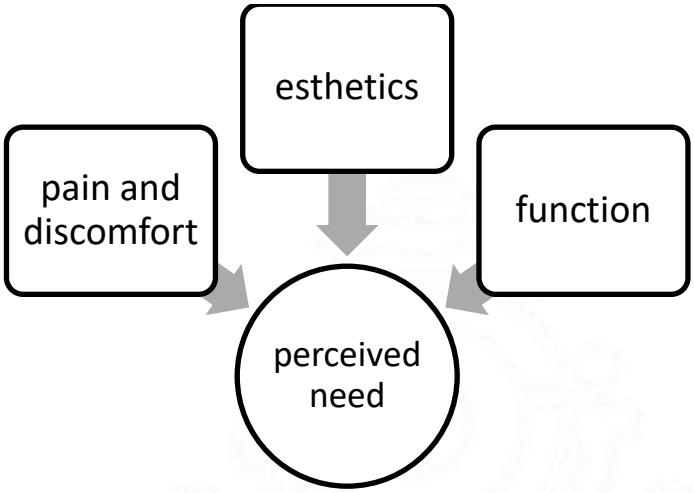


Figure 7: Domains in perceived oral health care needs

- Pain and discomfort- toothache, tooth decay, gum problem, oral ulcers, and white patches in gums.
- Function- tooth mobility, sensitivity, trauma, or fracture to natural or artificial teeth, bad breath.
- Aesthetics- Spacing due to missing teeth, Inappropriate and loose dentures, stained teeth.

The items selected for perceived oral health care needs were based on prioritizing the oral health problems faced by older people. The information was collected from cross-sectional studies done across the country within five years.

The questionnaire was developed with questions about perceived oral health care need for 10 most common oral problems in the past year with "yes, no" responses. The multiple-choice questions about the history of last dental visit, reasons for last dental visit, place of receiving the dental service, the choice of a particular Centre, and who had accompanied them to the dentist was added.

The term ‘Perceived oral health care needs and barriers in the utilization of dental services’ can be defined as those needs that a person perceives to seek oral health care for as well as those that he/she is unable to receive care due to the barriers that exist in utilization of oral health care services like limited availability of oral health care services or problems with accessibility, acceptability, and affordability.

3.2.2. Generation of items pool

Item pool generation simply means the source of items. The sources of items are collected from different methods like literature search, in-depth interviews with older people of varying socio-economic status (key informant interview), and expert interviews. The initial literature search was done to locate the available scales on perceived need, access to dental services, and utilization of dental services in adults, children, and older people across the globe. There were only a very few scales available which measures these constructs. Most of the scales available were of knowledge, attitude about dental services, quality of life etc. (Ajayi and Arigbede, 2012), (Anne N Åstrøm & Irene A Kida, 2007), (Andréa Maria et al, 2008), (Bahramian et al., 2015), (Bommireddy et al., 2016).

We discovered that few comprehensive tools for measuring the perceived oral health care needs and barriers in dental services utilization were available for the Indian context. Most tools were developed considering the utilization of dental services in adults rather than considering perceived needs and utilization of dental services. None of them were completely useful for our study. So, we attempted to develop a fresh tool on perceived oral health care needs and barriers in the utilization of dental services.

3.2.2.1. Literature review

From the literature review, it was felt that a gap exists for contextual scales for measuring perceived oral health care needs with relevance to the utilization of dental services among older people.

From the literature search a pool of 199 items was generated. All duplicate and unrelated items were removed. These items were reviewed by two experts and finalized with 100 items. These items come under the domains of perceived oral health care need, knowledge about dental care, attitude about dental care, last dental visit, and barriers in the utilization of dental services.

3.2.2.2. Key informant interview

As the name says, these are in-depth interviews with older people who can give relevant information about perceived oral health care needs and barriers in the utilization of dental services and are of varying socio-economic status. The guidelines of the interview were prepared earlier and were approved by ethical as well as the technical advisory committee of the institute. The in-depth interview aims to explore the complexity and in-process nature and meanings and interpretations that cannot be examined using positivist methodologies. In-depth interviews are more like conversations than structured questionnaires (Taylor, 2016). The interviews were done with the help of carefully worded questions on perceived need, utilization of dental services; barriers they face in receiving care. The questions were open-ended. The participants were encouraged to take up the topic and talk in their terms. To get a better picture probing was done occasionally to fill up the blanks in response. Place and time for the interview were selected according to the preference of the informant. Interviews were conducted in Malayalam, the participant's mother-tongue. The interviews of the participants were recorded with their consent. The interviews were conducted until the saturation of information was attained (Streiner et al., 2014), (Taylor, 2016) . A total of twenty-five interviews were done. The interviews were transcribed and codes were generated. Weft QDA was used for generating codes of the interviews. Coding is the process that enables the researcher to identify meaning to the information compiled during the study and set the stage for interpreting and drawing conclusions. The technique used was open coding. After the coding is achieved, the data is interrogated and systematically explored to generate meaning (Taylor, 2016).

These interviews were used to understand the concept of perceived oral health care needs, utilization of dental services. It also helped to understand people's impressions about barriers in the utilization of dental services. Informants explained the experiences that they had while utilizing the dental services in both public and private sectors and qualities that they expected in a dentist. The participants were able to recollect the barriers the faced in utilization of dental services. The participants expressed their concerns and attitude towards dental care.

3.2.2.3. Expert opinion.

The experts were chosen who had the most recent thinking in the field of dental care, geriatric dentistry, and extensive knowledge of the dental health system. The interviews were conducted on ten experts. The interviews were conducted with the help of the guidelines prepared and consent was taken from all the experts (Streiner et al., 2014). The interviews were recorded.

The questions were open-ended and the participants were encouraged for informal and unstructured responses to get the best of the essence in the topic. The interviews were transcribed and codes were generated. Weft QDA was used for generating codes of the interviews. The open coding technique was used for coding. After the coding is achieved, the data is interrogated and systematically explored to generate meaning. The categories with similar meanings were grouped together (Taylor, 2016). From these, "item pool" was created. To make the item more matching to the definitions of construct, sorting was done (Hinkin, 1995). After the creation of item pool, each item was subjected to expert's evaluation and prioritization. The interviews were conducted with dental practitioners, who shared their views about addressing the chief complaint, giving prompt treatment and their perception of barriers in utilization of dental services faced by older population.

3.2.3. Validity assessment

The scale is assessed for mainly three types of validity measurement

3.2.3.1. Content validity

Content validity was ensured by submitting the scale to experts for review, and testing the level of agreement among experts. For measuring the agreement of experts on the content of scale, we circulated the preliminary draft to the purposively selected experts. The sample of the experts was 8 in number and they consisted of 5 experts in dentistry and 3 experts from the field of public health for evaluation. The total number of items was 51. (The questionnaire given for content validation in appendix)

They were asked to review the scale and rate each item based on a four-point rating scale (0-can be avoided, 1-somewhat relevant, 3- relevant but not essential, 4-essential). We calculated the content validity ratio (CVR) and content validity index (CVI) using 'Lawshe method' (LAWSHE, 1975), (Streiner et al., 2014).

CVR= (Ne –N/2) / (N/2)

"Ne" denotes the number of experts who evaluated the item as essential

"N" is the total number of experts in the panel.

Eg: Ne=7, N= 8. Then, 7-(8/2)/ (8/2) = 0.75.

Based on this, each item acquires a score. The content validity ratio thus obtained (CVR) was used to assess the validity of each item. The scale content validity index (CVI) was used, which is the mean value of all CVR of retained items. The CVR values can range from -1 to +1 and the value 0 indicates that half of the panel feels that the item is essential. Lawshe recommended that a value of 0.85 for 8 raters and the value below that, the item should be discarded (Streiner et al., 2014). The raters were asked to comment if any domains or items were left out. The draft was modified considering the written and oral feedback of the experts. The content of the final version was further assessed by the thesis supervisor. After content validation 6 items were removed and 4 items were modified. So, the total number of items after content validation is 45.

3.2.3.1.1. Translation to Malayalam.

English is not the first language of the respondent population so; the tool was translated to Malayalam. The main challenge of this translation was to achieve equivalence between the original version and the translated version. The translation was done to achieve the conceptual equivalent of a word or a phrase, and not a word-for-word translation. The meaning of the sentence was adapted and tried to give the best of the translation in a simple, clear, and understandable manner (WHO- Process of translation and adaptation of instruments). For achieving semantic equivalence, the translated version was given to a group of people and asked to rephrase the question in their own words or to say what they think the item means. After this stage the process of 'back translation' is done. Each items were translated back to the source language- English by a second person and the English versions were checked for uniformity. Conflicts were resolved by repeating this cycle. Each item in the translated and back-translated questionnaires had undergone strict verification and necessary corrections were done until both versions became agreeably consistent.

The testing of the drafted questionnaire was conducted in two different panchayats of Kollam district namely, Chathanoor and Anchal. The survey was conducted by the principal investigator with the help of ASHA worker. The lists of older people in the panchayat were provided by the ASHA workers and from the voter's list. The sample of 150 was randomly selected from the above list, from both the Panchayats. Older people were identified and questionnaires were administered to them. The sample selected was 150 that is the total number of items is 30 and five people per each item (Streiner et al., 2014).

3.2.3.2. Face validity

Face validity is a concept similar to content validation, and it has to be evaluated similarly by a subjective judgment of people. Face validity is desirable most of the time. In face validity where the judgments come from laymen (people who have the disease under study) rather than experts.

However, while content validity is restricted to the content of the test, face validity is not. Laymen can base their judgments about the adequacy of the test on any feature of the test, not just its content. Content validity is a more structured approach, whereas face validity is like a first impression.

Face validity is ensured by subjecting the scale to the examination of experts in the field. It is done by providing the scale to public health experts, dentists practicing in rural, urban, government, and private sectors, older people of varying socio-economic class, and the general population. Face validity explains whether the scale covers all the relevant domains. Malayalam and English versions were submitted to experts for confirming translational validity. The scale was submitted to 30 experts, to have a better validation process. Four questions are removed after face validity.

3.2.4. Reliability assessment

The questionnaire is examined to assess its reliability. Reliability refers to the ability of a questionnaire to consistently measure an attribute and how well the items fit together, conceptually. Two estimators of reliability are commonly used: internal consistency reliability and test-retest reliability: both are used to examine the reliability of the questionnaire

3.2.4.1. Internal consistency reliability

Internal consistency was measured by Cronbach's alpha coefficient. It measures how closely related a set of items are as a group. For calculating Cronbach's alpha SPSS (21.0) IBM Software was used. The internal consistency was assessed for the questionnaire "barriers in the utilization of dental services" which consists of 23 items. The questionnaire perceived oral health care needs information's were consistent with the literature therefore further validation was not needed. Alpha should be above 0.8 for good reliability. In several studies internal

consistency serves as criteria for initial assessment and purification of the scale. The squared multiple correlations are like the power of items. We checked the corrected 'item-total' correlations which are the correlations between scores on each item and the total scale scores. Values with negative total correlations are reverse scored and checked. Even after reverse scoring those items showed negative correlation the items are removed. After removing three items alpha was done on twenty items. Cronbach's Alpha is 0.84 for total items. The scale was subjected to reliability testing after each item reduction. The final scale consisted of 18 items and the Cronbach's Alpha is 0.84 for total items

3.2.4.2. Test-retest reliability

For establishing the consistency across the items, Test-retest reliability assessment was done. It was performed by administering the questionnaire to the same sample of thirty people on two different occasions with a gap of 21 days. SPSS (21.0) IBM Software was used for finding the correlation statistics. Pearson correlation was used.

3.2.5. Criterion validity

Criterion validity was not assessed because of the absence of any comprehensive criterion measure, which can be used for validity measurement.

Further validation of the scale

3.2.6. Factor analysis:

Factor analysis is used to assess the dimensionality of scale and reduce the number of items. It confirms a smaller number of constructs from a large number of observed items. Researchers may use factor analysis for a variety of purposes. Factor analysis is classified into two, viz. exploratory factor analysis and confirmatory factor analysis. We used exploratory factor analysis to assess the construct validity and examine the underlying dimensionality of the items set. Thus, we can categorize a large set of items into meaningful subsets that measure different factors. Confirmatory factor analysis measures whether a specified set of factors influences the responses in the predicted way (Ganga and Kutty, 2015). In this study we employed exploratory factor analysis, because there is no perfect theory developed for the perceived oral health care needs and barriers in the utilization of dental services. The sample size for the factor analysis is considered as important because factor structure arising from a large sample is considered as

more stable (Frank J.Floyd and Keith F. Widaman, 1995). A sample size of 150 is considered as adequate for ordinary factor analysis. In this study we considered 150 as an appropriate sample for factor analysis.

Phase II

3.3. Perceived oral health care needs and barriers in the utilization of dental services-Cross Sectional Survey

This part of the study is phase II which was a population-based cross-sectional survey, a questionnaire, a semi-structured interview schedule, and a clinical examination were used to collect information from the participant. The questionnaire consisted of four parts. The first part consisted of socio-demographic details. The second part was the developed questionnaire on perceived oral health care needs, its barriers in dental service utilization which is used to assess the perceived need, and the barriers they face in receiving dental care. The third part consists of the GOHAI (Geriatric/ general oral health assessment index) questionnaire which measures self-reported measures based on a functional definition of health. The fourth part consists of normative oral health assessment i.e., clinical assessment of oral health status of older persons using WHO oral health assessment form 2013. The socio-demographic details, perceived oral health care needs questionnaire and GOHAI questionnaires were self-administrable; however, it had to be administered to subjects with lower literary status.

3.3.1. Study variables

Given the research objectives, the explanatory variables are listed below and defined all selected variables:

Table 2: Explanatory variable used in the study

Variables	Type	Definition
Age	Continuous	Age of the respondent in years, it refers to the age of the older person above 60 years.
gender	categorical	Gender as reported by the participant.
Marital status	categorical	The category as reported by the participant i.e., unmarried, married, separated, divorced, and widow/widower.
education	ordinal	Completed the highest education level in years. Calculated
occupation	nominal	The major occupation of the respondent.

An estimate of monthly income	Continuous	The expected monthly income a family earns.

3.3.2. Sample size calculation for the cross-sectional survey

In 2011, nearly seventy-one percent (71%) of the older people in Manipal, South India had unmet tooth extraction needs. The sample size was calculated, taking this prevalence.

The Sample size calculation was done using Open-Source Epidemiologic Statistics for Public Health (Open Epi) version 3.03a. At a 95% confidence level the required sample size was 317 older people from the whole district. The sample was enhanced by 20% to accommodate the non-response rate and rounded to whole numbers. So, the total sample for the cross-sectional study is 400. The formula applied was,

Taking 71% needed dental extraction in a study done in South India (Manipal) (Thomas, 2011)

Sample size, n = [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1) +p*(1-p)]

Using the following parameters:

Population size (for finite population correction factor or fpc) (N): 350012
Hypothesized % frequency of outcome factor in the population (p): 71%+/-5 (unmet need for dental extraction from a previous study in a rural population)[23]
Confidence limits as % of 100(absolute +/- %) (d): 5%
Design effect (DEFF):1
The resultant sample size was 317, rounded off to 320.
The total sample size is 320 putting non-response rates to be 20% then
The total sample size is 381 rounded off to 400

3.3.3. Inclusion criteria and exclusion criteria for the survey

3.3.3.1. Inclusion criteria

The older person who is:

- A person above the age of 60 was included in the study.
- The older person whose permanent address (according to the information provided by the LSGD) belongs to the districts of Kollam and who was available to participate in the study during the intended period.

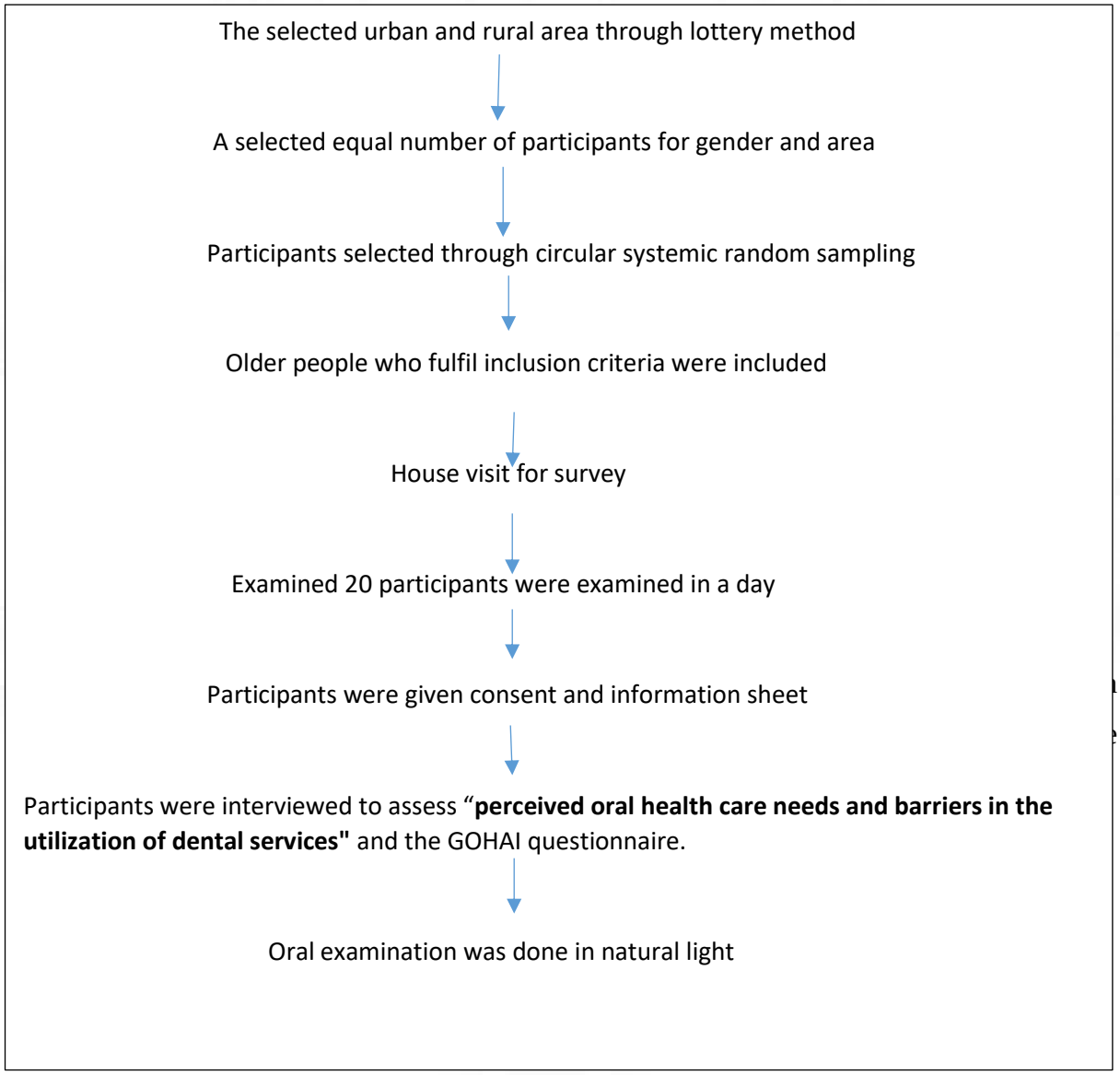
- People who had responded rationally.
- People of diverse socio-economic status, educational level was included in the study

3.3.3.2. Exclusion criteria

- Those people who were not willing to provide with the informed consent
- People with dementia.

3.3.4. Sampling procedures

Figure 8: Sampling procedure used in the study



The urban participants were selected from Kollam Corporation and rural participants from Kalluvathukkal Grama Panchayat. There was an equal division of sample for both urban and rural areas and gender. The participants of the study were selected from the voters' list (list given by the concerned LSGD) randomly. The final participants for the survey were identified through circular systematic random sampling.

The older person was contacted personally or with the help of ASHA workers in the concerned area. People who had given consent for the study where approached directly at their current residences, workplaces, or any other convenient place of their choice. To facilitate fieldwork, the older people were grouped by location. The principal investigator has visited each of the identified addresses to collect data.

3.3.4.1. Plan for non-response and substitution

By oversampling, we had compensated to some extent for non- participation. Every respondent who refused to participate was requested to explain the circumstances of dissent so that the reasons for non-response were recorded. In case, a selected participant (who gave verbal consent on initial contact) was found unavailable during data collection due to any reason (ill-health, traveling, unavailable for a long period, etc). He/she was contacted 3 times before being labeled as non- response. The number of non-responses was noted.

3.3.5. Implementation of the cross-sectional survey.

3.3.5.1. Research tools and data collection procedures

A structured interview schedule perceived oral health care needs and barriers in dental service utilization scale, WHO oral health assessment form (2013), and GOHAI questionnaire are used for the survey.

3.3.5.2. General preparation

3.3.5.2.1 General permissions

Persons in authority such as the District Medical Officer, The Medical Officers of Paripally, Kadavoor, Palathara, and Eravipuram PHC's, the concerned HI, JHI, JPHN were contacted. They had granted permission and support in advance. For the community survey, help was

sought from the ASHA worker. ASHA worker helped to coordinate the activities in a ward and also to gain the corporation from the participant.

3.3.5.2.2 Keeping a logbook

The principal investigator of the survey had maintained a logbook in which, the area of each day's visit, the number of persons participated, and information about each survey site, the amount spent on the day including remuneration to ASHA worker was recorded. Furthermore, observations made and impressions formed at the time had helped in the assessment of survey results. Keeping a logbook of observation helped in an easy recall of observation.

3.3.5.2.3 Pilot Study

Doing a pilot survey in a small proportion of participants from the main cross-sectional survey is very important in identifying any organizational or technical problems that may arise. Doing a pilot survey had helped the investigator in time management, identify potential difficulties faced and prompt modifications needed that may be necessary before the actual survey is commencing.

3.3.6 Normative oral health assessment

Clinical examination was done to assess the oral health status of older persons. Clinical assessment was done using the modified WHO Oral Health assessment form 2013. The dentition status, dental caries (DMFT), periodontal status (CPI INDEX), oral mucosal lesions, dental erosions, dentures were recorded ("WHO | Oral health surveys: basic methods - 5th edition," 2013), (Soben Peter, 2017).

3.3.6.1 Instruments and supplies

The number of instruments and supplies used in the survey for a single day was 20 sets of instrument supplies that were used for 20 participants every day. These instruments were sterilized and reused for the survey.

The following instruments and supplies are used:

1. Forms for consent, participant information sheets, survey proforma, questionnaires.
2. instruments for oral examination:
    - Plane mouth mirrors
    - Metallic periodontal probes (Community Periodontal Index (CPI) probe),
    - several pairs of tweezers

- Containers (one for used instruments and one for disinfecting or sterilizing instruments)
- A concentrated disinfecting solution in sufficient quantity
- Rubber gloves
- Cloth or paper hand towels
- Gauze.

The used instruments were placed in disinfectant solution, then washed and drained well before sterilization.

3.3.6.2 Infection control

Before the commencing of the survey the principal investigator was aware of the possibility of cross-infection when conducting examinations or handling contaminated instruments. Current national recommendations and standards have been followed for both infection control and waste disposal. To reduce the risk of cross- infections the disposable masks and gloves was used. Instrument sterilizer (hot water sterilizer) is used to sterilize the instruments. The diagnostic waste was wrapped in a plastic bag and handed over to the waste management system of IMA for proper waste disposal.

3.3.6.3 Examination area

The area for conducting examinations was planned and arranged for maximum ease of operation. The areas were either the house of the participant or the primary health sub-center in the nearby area. The examination position of the participants depends on the furniture available. The subject was asked to sit on a chair with the examiner standing behind or front of the subject's chair.

3.3.6.4 Lighting

The examination was done in natural light. Torchlight was also used.

3.3.6.5 Assessment of oral health status

3.3.6.5.1 Dental caries.

According to WHO, a tooth is considered sound if it shows no evidence of treated or untreated clinical caries. A tooth is considered decayed when it has a white or chalky spot, unmistakable cavity, undermined enamel or softening of the floor which should be felt by CPI probe.

Dental caries is caused by the action of acids on the surface of enamel. The acid is produced when sugar in food reacts with bacteria present in the plague on the tooth surface. The acid produced leads to demineralization. The main treatment option for dental caries is to fill the cavity. The treatment for dental caries ranges from simple tooth restoration to complex procedures like root canal treatment. WHO had coded dental caries based on caries status and treatment taken.

Table 3: coding of dentition status-permanent teeth

Permanent dentition		
Crown	Root	Condition
0	0	Sound
1	1	Caries
2	2	Filled, with caries
3	3	Filled, no caries
4	-	Missing due to caries
5	-	Missing for any other reason
6	-	Fissure sealant
7	7	Fixed dental prosthesis abutment, special crown or veneer/implant
8	8	Un erupted tooth (crown)/unexposed root
9	9	Not recorded

The criteria for diagnosing a tooth status and the coding are as follows:

(A) Sound crown- A crown is coded as sound or 0, if there is no evidence of treated or untreated clinical caries. The process of dental caries shows cavitation and other features. Some features that had not associated with caries are also included as the sound they are:

- White or chalky spots in the tooth surface
- Discolored or rough spots that are not soft to touch with a probe
- Stained enamel pits or fissures that do not have visible cavitation or softening of the floor or walls which are detectable with a probe
- Dark, shiny, hard, pitted areas of the tooth showing signs of moderate to severe enamel fluorosis
- Lesions that are abrasion.

(B) Carious crown- *Caries is recorded when a lesion in a pit or fissure, or on a smooth tooth surface, has an unmistakable cavity, undermined enamel, or a detectably softened*

floor or wall. A tooth with a temporary filling or one which is filled but also decayed should also be included as decay.

(C) Carious root. If the carious lesion on the root does not involve the crown surface, it should be recorded as root caries.

(D) Filled tooth, with the caries-A tooth is considered to be filled, with decay, when it has permanent restorations and areas that are decayed.

(E) Filled tooth, with no caries. A tooth is considered filled, without caries, when one or more permanent restorations are present and there is no caries anywhere on the tooth. A tooth that has a crown because of previously filled decay is recorded in this category. A tooth that has been crowned for reasons other than caries using a fixed dental prosthesis abutment is coded 7.

(F) A missing tooth, due to caries- This code is used for teeth that have been extracted because of caries.

(G) A permanent tooth missing due to any other reason- This code is used for permanent teeth deemed to be absent congenitally or extracted for orthodontic reasons or because of periodontal disease, trauma, etc.

(H) Fissure sealant- This code is used for teeth in which a fissure sealant has been placed.

(I) Fixed dental prosthesis abutment, special crown or veneer- This code can also be used for crowns placed for reasons other than caries and for veneers or laminates covering the tooth surface, on which there is no evidence of caries or a restoration.

(J) Unerupted tooth (crown) - This classification is restricted to permanent teeth.

3.3.6.5.1.1 DMFT index

Information on the Decayed, Missing, and Filled Teeth Index (DMFT) is recorded. The D component includes all teeth which are recorded decay under the D criteria. The M component comprises teeth missing due to caries or for any other reason. The F component includes teeth that are filled due to caries. The basis for DMFT calculations was 32 teeth, i.e. all permanent teeth including wisdom teeth. Teeth with fissure sealant/fixed dental prosthesis/ bridge abutment, special crown, or veneer/implant are not included in calculations of the DMFT index.

3.3.6.5.2 Periodontal status: Community periodontal index (CPI)

Periodontal disease is a pathological inflammatory condition of the gum and the supporting alveolar bone. The two types are gingivitis and periodontitis. Gingivitis is the inflammation of the gum (gingiva) while periodontitis is the inflammation affecting the gingiva, alveolar bone,

and supporting structures. The periodontitis is characterized by the formation of pockets in the periodontium. This condition will finally lead to the loosening of the teeth.

The indicators of periodontal status assessment are gingival bleeding and periodontal pockets. The instrument used for assessing is the WHO CPI probe. The instrument is a specially designed, lightweight metallic probe with a 0.5-mm ball tip, with a black band between 3.5 and 5.5 mm, and rings at 8.5 and 11.5 mm from the ball tip. All teeth present in the mouth are examined for absence or presence of gingival bleeding and periodontal pockets; pocket depth is measured with the WHO CPI periodontal probe.

3.3.6.5.2.1 Assessing for gingival bleeding and periodontal pockets using CPI probe

Gingiva of all teeth present in the mouth were examined carefully by inserting the tip of the WHO CPI probe between the gingiva and the tooth to assess the presence or absence of bleeding response. The sensing force used was no more than 20 g. When the probe was inserted, the ball tip had followed the anatomical configuration of the tooth surface and the root. The probe tip was inserted gently into the gingival sulcus or pocket. (Soben Peter, 2017)

3.3.6.5.2.2 Gingival bleeding scores.

Gingival bleeding

Table 4: Gingival bleeding scores

0	Absence of condition.
1	Presence of condition.
9	Tooth excluded.
X	A tooth not present.

3.3.6.5.2.3 Periodontal Pocket scores

Table 5: periodontal pocket scores

0	Absence of condition
1	Pocket 4–5 mm
2	Pocket 6 mm or more
9	Tooth excluded
X	Tooth not present

3.3.6.5.3 Wasting diseases/ dental erosion

The prevalence, severity, and several teeth affected by dental erosion is a major public health problem. Dental erosion results from the loss of calcified dental tissue or enamel by chemical processes not associated with bacterial action. Enamel tissue is lost by exposure to acids that may come from dietary sources or maybe intrinsic, i.e. in individuals suffering from diseases like bulimia, gastroesophageal reflux, or people with heavy alcohol consumption and chronic vomit.

The following codes are used to shows an erosion at different levels:

Table 6: scores for wasting diseases

0	No sign of erosion
1	Enamel lesion
2	Dentinal lesion
3	Pulp involvement

3.3.6.5.4 Oral mucosal lesions

The oral mucosa and soft tissues in and around the mouth have been examined in every subject. The instrument used is a plane mouth mirror. The diagnoses made in oral mucosal lesions are tentative and final diagnosis can only be made after further investigations.

The following codes apply for adults:

Table 7: scores for oral mucosal lesions

0	No abnormal condition
1	Malignant tumor
2	Leukoplakia
3	Lichen planus
4	Ulceration (aphthous, herpetic, traumatic)
5	Acute necrotizing ulcerative gingivitis
6	Candidiasis
7	Abscess
8	Other condition

3.3.6.5.5. Denture status

The presence of removable/fixed dentures recorded for each jaw.

The codes are as follows:

Table 8: scores for denture status

0	No denture
1	Partial denture
2	Complete denture
9	Not recorded

3.3.7 **GOHAI questionnaire- oral health-related quality of life assessment (OHRQoL).**

Oral health-related quality of life refers to the impact of oral diseases on individuals' normal functioning about general health and well-being.

General/Geriatric Oral Health Assessment Index (GOHAI) is regarded as the most comprehensive assessment for measuring the OHRQoL of the older population. The GOHAI measure is a 12-item questionnaire developed in 1990 in the USA by Atchison and Dolan for use with older populations with three months' time reference.

The questionnaire was developed to evaluate three dimensions of oral-health related quality of life among older people, which includes physical functions like eating, speech, swallowing; psychosocial functions like worry, worry about oral health, discontent with appearance, self-consciousness about oral health, avoidance of social contacts because of oral problems; pain or discomfort including the use of medication or discomfort from the mouth. GOHAI gives more weightage to pain and discomfort. It mainly focuses on the subjective assessment of oral health.

First we did the translation and linguistic adaptation of the questionnaires into Malayalam. We followed the guidelines regarding the translation of the questionnaire into Malayalam. The version translated by professional (language expert) was compared by the principal investigator. The translation was done to achieve the equivalence of a word or a phrase. The meaning of the sentence was adapted and gave the best of the translation in a simple, clear, and understandable manner ("WHO | Process of translation and adaptation of instruments,"). The translated version was given to a group of people and they were asked to rephrase the question

in their own words or to say what they think the item means. After this stage the process of 'back translation' is done. Each item is translated back to the source language- English by a second person and the English versions were checked for consistency. Conflicts were resolved by repeating this cycle. Each item in the translated and back-translated questionnaires had undergone strict verification and necessary corrections were done until both versions became agreeably consistent and finalized the questionnaire. (Appendix for English and Malayalam version). GOHAI is a self-administered questionnaire.

The questions were about oral problems and difficulties in the past three months. The answers were on a Likert scale, with options of 1=always/often, 2=sometimes/seldom, 3=never. Participants were instructed to give a tick mark to the appropriate answer to each question. The responses that were not responded were later replaced by the mean value of all valid responses for analysis. Cases with more than 9 entries in the missing category were discarded.

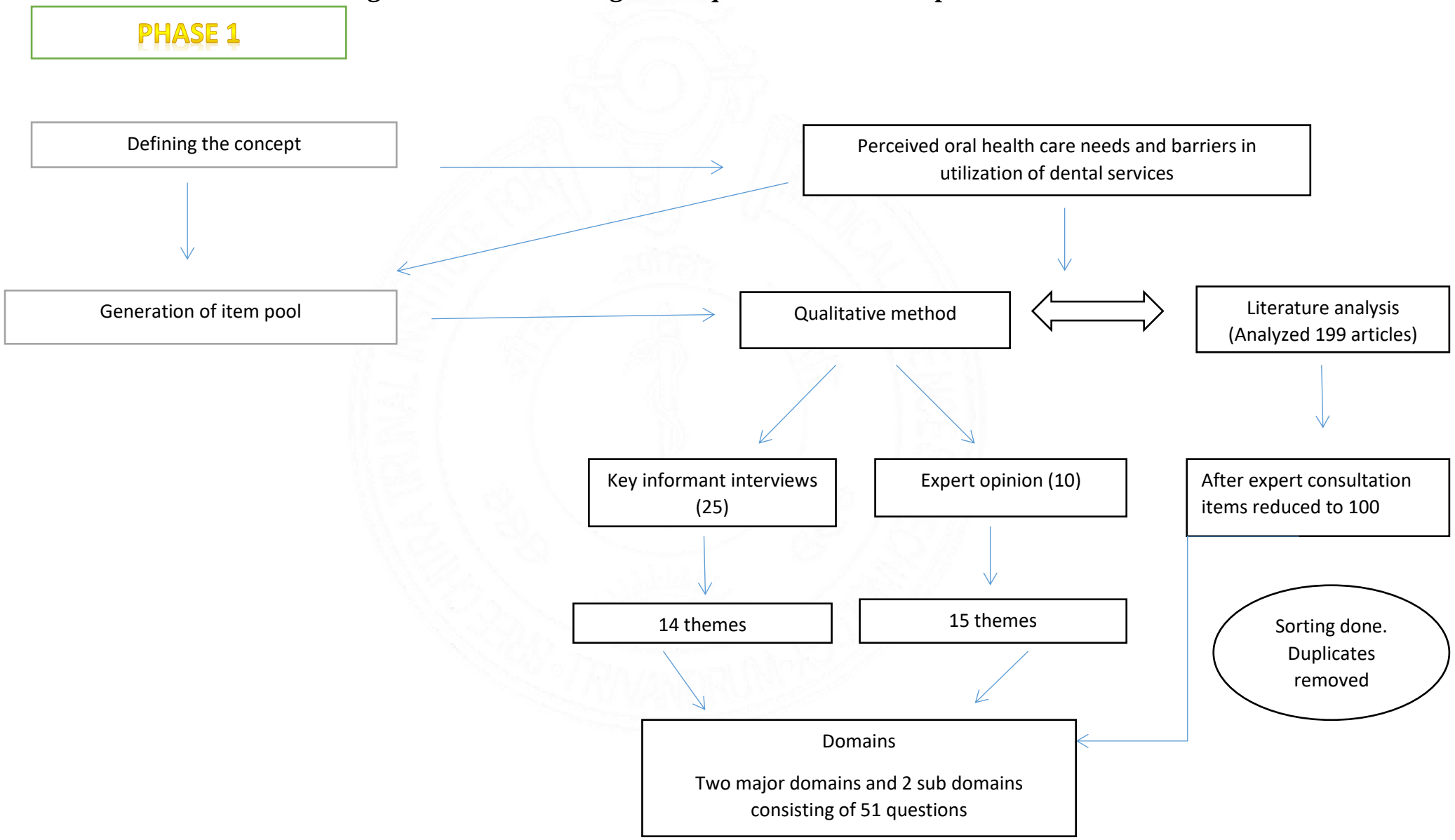
Table 9: List of GOHAI questions in psychosocial, pain and physical domains

Dimension	Items
Physical	How often did you limit the kind or amount of food you eat because of problems with your teeth or dentures?
	How often did you have trouble biting or chewing different kinds of food, such as firm meat or apple?
	How often were you able to swallow comfortably?
	How often have your teeth or dentures prevented you from speaking the way you wanted?
Pain	How often were you able to eat anything without feeling discomfort?
	How often did you use medication to relieve pain or discomfort from around your mouth?
	How often were your teeth or gums sensitive to hot, cold, or sweet?
Psychosocial	How often did you limit contact with people because of the condition of your teeth or dentures?
	How often were you pleased or happy with the looks of your teeth and gums or dentures?
	How often were you worried or concerned about the problems with your teeth, gums or dentures?
	How often did you feel nervous or self- conscious because of the problem with your teeth, gums, or dentures?
	How often did you feel uncomfortable eating in front of people because of problems with your teeth or dentures?

The psychosocial dimension of GOHAI contains 5 questions that involve apprehension about oral health, self-concern, awareness of health, and limited social contact due to poor oral and self-image. The physical dimension has 4 questions and includes aspects of eating, speaking, and swallowing. The pain and discomfort dimension is associated with oral-dental status and contains 3 questions. Items in each dimension are shown in table 8.

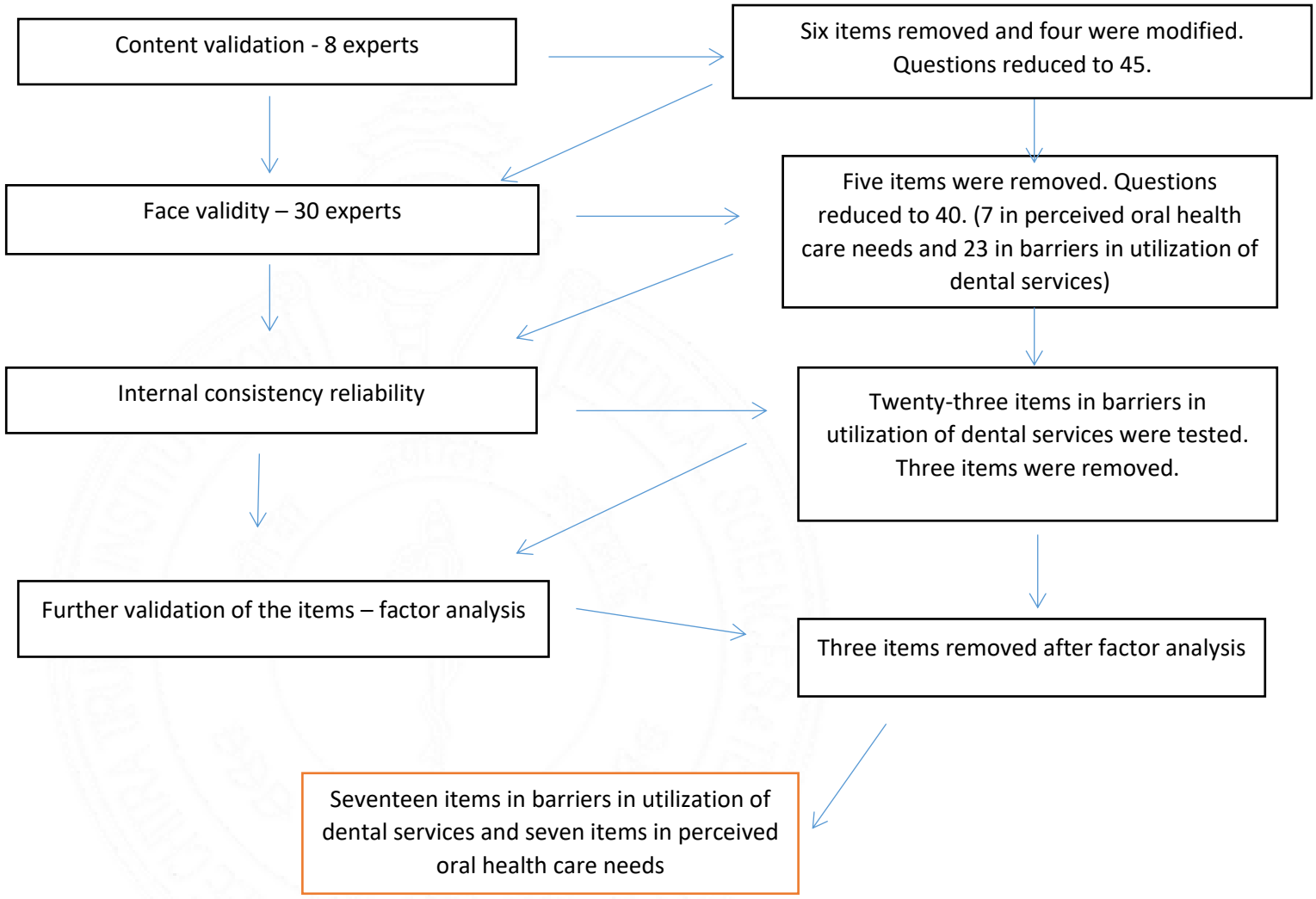
Chapter IV
RESULTS

Figure 9: Schematic diagram of questionnaire development



PHASE II

Testing phase



4.1 phases in study

The study "perceived oral health care needs and barriers in utilisation of dental services" was conducted in two phases:

1. Developmental phase: questionnaire development is done in this phase by using qualitative as well as quantitative methods.

2. Testing phase: In this phase, validity and reliability of the questionnaire is established by administering the scale to the decided number of subjects.

3. Normative oral health assessment using WHO oral health assessment form 2013

4. Oral health related quality of life assessment using geriatric oral health assessment index (GOHAI) questionnaire.

4.2. Developmental phase

We had conducted key informant interviews with older people and collected expert opinion from dentists. The results are discussed below:

Respondents had described the word "perceived need in oral health care" in her/his language as *"The need that we feel like pain, loose tooth etc which urges us to visit a dentist and take treatment"* According to respondents, the main barriers they face in receiving dental care were classified as personal barriers and barriers associated with dentist and dental care. The personal barriers in accessing dental care were financial issues, adaptation to the oral health issues, using home care remedies, fear of dental procedures etc. One of the participants specified that "*I have many health issues. I am taking medicines for many diseases so I can't take dental treatment"*. This information emphasising that systemic disease prevents people from receiving dental care. They need to take consultation from their treating physician in order to take dental treatment.

One of the major issues raised by the participants was affordability, one of the participants said *"I don't have enough money to buy medicines for diabetes and blood pressure, then how will I get a dental treatment which is expensive, I buy medicines from medical store when in pain"* most of the participants perceive a dental need but, their financial condition hinders them from receiving care. A few participants had reported fear of dental treatment which deters them from receiving care. The sound of the drill, the setting of the dental clinic, dental instruments and injections add more to the fear.

The qualities that make a dentist respectable were "good communication", 'caring',' friendly attitude'. They also expected health care professionals to explain them all the treatment options available in a simple and understandable way. They expect their dentist to treat them irrespective of their financial status. Participants mentioned that they will trust health care professionals who are not profit oriented and do not do cherry picking.

The other issues people face while accessing dental care are long waiting hours and need for multiple visits. As one of the participants explained *"to get a treatment from government hospital it takes months to get an appointment, but if I go to private hospital, I can get treatment faster but the cost is high"*

The interviews conducted with dental practitioners discussed issues ranging from poly morbidity of older people to confusion created by other dentist in choosing the best treatment. The dentists discussed about the wide range of diseases that the person may have as the age progresses. According to most of the dentists who had participated in the interview said that older people do not prioritise their dental treatment needs because of poly morbidities, dependency status of older people, taking over the counter medication to relieve pain.

One of the participants expressed concern about confusion of the patient in choosing the right dental treatment: *"a patient may not come to me alone; he may go to many experts. The*

opinions they get from different dentist are different. One may say to fill the teeth other may say to extract. So the patient may be confused and there is no clear objectivity among dentist"

Most of the dentists had an opinion that "it is not the pocket of the doctor that is important, but the satisfaction of the patient". They feel that the need of the patient is important and this can give good treatment outcome.

We had obtained 14 themes after conducting key informant interviews from older people. They were lack of time, no one to take to hospital, fear of dental treatment, no money, systemic diseases, religious belief, adaptation to condition, long waiting hours, lack of knowledge, ego of dentist and no rest after treatment.

We had obtained 15 themes after expert opinion. They were Low priority for dental treatment, Managing with other teeth, Financial barrier, Dependency status, Lack of clarity in the information provided by dentist about treatment plan, Lack of communication to the patient about treatment plan, Taking home care, Multiple appointments and delay in treatment, Poor patient management, Lack of awareness about dental diseases, Give choices to patient, Awareness about interrelationships between general health and dental health, Pain as expressed need, Pleasant attitude of dentist help in treatment and More concern to function. The themes of the older people and the experts were combined and domains were created.

The domains were identified and item pool was created from literature analysis, the theories adapted and from the interviews, as well as the personal opinions and comments of the experts and older people.

The questionnaires were divided into:

I. PERCEIVED NEED

- Perceived oral health care needs
- Dental visits and experience

II. BARRIERS IN UTILISATION OF DENTAL SERVICES

Personal barriers of older people

- Low priority
- Affordability issues
- General health issues
- Time issue
- Home remedy
- Fear

Barriers associated with dentist and dental treatment

- Lack of clarity and objectivity
- Delay in treatment
- Dentist behaviour

4.3.Testing phase

4.3.1. Psychometric characteristics of scale: reliability and validity

Validity of the questionnaire

4.3.1.1. Content validity

Content validity was assessed by subjecting the questionnaire to experts in dentistry and public health field. They assess the scale for its content adequacy and item sufficiency. The average content validity ratio (index) was 0.90. The CVR can range from -1 to +1 and the value 0 means that half of the panel feels that the item is essential. Lawshe recommended that a value of 0.85 for 8 experts and the value below that, the item should be discarded. The experts were asked to comment if any domains or items are not included. One item "dental treatment is not an emergency care" was included after the experts commend. The draft was modified considering the written and oral feedback of the experts. The content of the final version was further assessed by thesis supervisor. After content validation 6 items were removed and modified 4 items. So, the total number of items after content validation was 45. Results are shown in table 1. The items that are removed in content validation and items modified after content validation is shown in table 2 and 3 respectively.

Table 10 content validation

	E1	E2	E3	E4	E5	E6	E7	E8	No: agreements	Mean CVR
Q1	1	1	1	1	1	1	1	1	8	1
Q2	1	1	1	1	1	1	1	1	8	1
Q3	1	1	1	1	1	1	1	1	8	1
Q4	1	1	1	1	1	1	1	1	8	1
Q5	1	1	1	1	1	1	1	1	8	1
Q6	1	1	1	1	1	1	1	1	8	1
Q7	1	1	1	1	1	1	1	1	8	1
Q8	1	1	1	1	1	1	1	1	8	1
Q9	1	1	1	1	1	1	1	1	8	1
Q10	1	1	1	1	1	1	1	1	8	1
Q11	1	1	1	1	1	1	1	1	8	1
Q12	1	1	1	1	1	1	1	1	8	1
Q13	1	1	1	1	1	1	1	1	8	1
Q14	1	0	1	0	1	1	0	1	5	.25
Q15	1	1	1	1	1	1	1	1	8	1
Q16	1	1	1	1	1	0	0	1	6	.25
Q17	1	1	1	1	1	1	1	1	8	1
Q18	1	1	1	1	1	0	1	1	7	.75
Q19	1	1	1	1	1	1	1	1	8	1
Q20	1	1	1	1	1	1	1	1	8	1
Q21	1	1	1	1	1	1	1	1	8	1
Q22	1	1	1	1	1	1	1	1	8	1
Q23	1	1	1	1	1	1	1	1	8	1
Q24	1	1	0	1	1	1	1	0	6	.5
Q25	1	0	1	0	1	1	1	0	5	.25
Q26	1	1	1	1	1	1	1	1	8	1
Q27	1	1	1	1	1	1	1	1	8	1
Q28	1	1	1	1	1	1	1	1	8	1
Q29	1	1	1	1	1	1	1	1	8	1
Q30	1	1	1	1	1	1	1	1	8	1
Q31	1	1	1	1	1	1	1	1	8	1
Q32	1	1	1	1	1	0	1	1	7	.75
Q33	1	1	0	1	1	1	1	1	7	.75
Q34	1	1	1	1	1	1	1	1	8	1
Q35	1	1	1	1	1	1	1	1	8	1
Q36	1	1	1	1	1	1	1	1	8	1
Q37	0	1	0	1	1	1	1	1	6	.75
Q38	1	1	1	1	1	1	1	1	8	1
Q39	1	1	1	1	1	1	1	1	8	1
Q40	1	1	1	1	1	1	1	1	8	1
Q41	1	1	1	1	1	1	1	1	8	1
Q42	1	1	1	1	1	1	1	1	8	1
Q43	1	1	1	1	1	1	1	1	8	1
Q44	1	1	1	1	1	1	1	1	8	1
Q45	1	1	1	1	1	1	1	1	8	1
Q46	1	1	1	1	1	1	1	1	8	1
Q47	1	1	1	1	1	1	1	1	8	1
Q48	1	1	1	1	1	1	1	1	8	1
Q49	1	1	1	1	1	1	1	1	8	1
Q50	1	0	1	0	0	0	1	1	4	0
Q51	1	1	1	1	1	1	1	1	8	1
total	50	48	48	48	50	47	49	49	7.62	0.90

Table 11 items removed after content validation

Sino	Items removed after content validation
1	Do you feel that you need to visit a dentist to visit a dentist to seek care for any of the mentioned problems? (yes/no)
2	I don't feel the need
3	I give importance to my general health than dental health
4	Dentist does not try to build up a rapport
5	Dentist does not have a pleasing behaviour
6	Dentist does not engage in personal conversation

Table 12 items modified after content validation

Sino	Items modified after content validation	Items modified as
1.	Why did you choose the particular centre, please explain…….? (open ended)	Why did you choose a particular centre for dental visit? (closed ended)
2.	I am under medication for systemic diseases	Diseases like diabetes, hypertension and other conditions prevent me from taking dental treatment.
3.	I have to get the consultation of my doctor before doing any dental procedures	I have to take the advice from my doctor (cardiologist, neurologist etc.) before undergoing any dental procedures.
4.	Dentist does not communicate well	I feel it would be better if my dentist communicates well

4.3.1.2. Face validity

Face validity is ensured by subjecting the scale to the examination of experts in the field. It is done by providing the scale to public health experts, dentists 'practicing in rural, urban, government and private sector, older people of varying socio-economic class and general population. Face validity explains, whether the scale covers all the relevant domains. Both Malayalam and English versions were submitted to experts for ensuring translational validity. Scale was submitted to 30 experts, in order to have a better validation process. The comments from the experts were considered and necessary corrections were made. Five questions are removed after face validity shown in table 4.

Table 13 items removed after face validation

Sino	Items removed after face validation
1.	Please state the reason for your satisfied / dissatisfied experience. (open ended)
2.	I don't have anyone to take me to hospital
3.	I don't get time to take rest after doing dental procedures
4.	I have difficulty in arranging an appointment with a particular dentist
5.	I use tobacco when in pain

4.3.2. Reliability of questionnaire

4.3.2.1 Internal consistency reliability

The internal consistency reliability was done on 23 items. As explained in Figure 9 the testing phase was done only for the questionnaire "barriers in utilisation of dental services". Three questions were reverse scored, the values that a have negative scoring is removed. The values zero and above zero is counted. The Cronbach's alpha for the scale is 0.84. With standardized items Cronbach's alpha value is 0.825. Correlation among individual items showed that all items of the scale correlated positively. The Cronbach's Alpha (Table 14), and item statistics and total items statistics (Table 15) showed good internal consistency of the items in scale. The scale was subjected to further reliability analysis after doing necessary item reduction in factor analysis. The items were reduced to 20. The Cronbach's alpha for the final scale is 0.84. With standardized items Cronbach's alpha value is 0.835.

Table 14 internal consistency

Sample size	Mean	Variance	SD	Number of items	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
150	39.7667	93.898	9.69011	20	.840	.825

The table 1 shows the Cronbach's Alpha values and Cronbach's Alpha values based on standardized items is higher than cut-off value (r=0.7).

Table 15 item and item total statistics of the scale

Items	Mean	Std. Deviation	Scale mean if item deleted	Scale variance if Item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted
In my opinion dental treatment is expensive.	1.7133	.85402	38.0533	88.306	.303	.837
I wish there is someone to accompany me to the dental hospital	2.2733	.87391	37.4933	89.245	.236	.840
There is no time for me to take dental treatment.	2.2667	.85661	37.5000	87.889	.328	.836
Diseases like diabetes, hypertension, and other conditions prevent me from taking dental treatment.	2.5133	.62107	37.2533	92.164	.113	.843
I have to take the advice from my doctor (cardiology, neurologist etc.) before undergoing any dental procedures.	2.4267	.69848	37.3400	91.635	.133	.842
I don't need treatment for all the dental problems because I am able to manage with other existing teeth.	1.7067	.85567	38.0600	92.902	.016	.848
I don't think I need treatment at this age	2.0067	.87083	37.7600	88.130	.306	.837
I think dental care is not an emergency need.	2.2067	.84581	37.5600	91.322	.115	.844
I am scared of dental injections	2.3667	.92262	37.4000	88.698	.250	.840

I am scared of contracting other diseases from dental clinic	2.3333	.81650	37.4333	91.710	.097	.845
I usually take traditional remedies (salt, cloves, eucalyptus oil etc) to relieve my tooth problems.	1.9333	1.19094	37.8333	89.697	.123	.849
When in tooth problems I get medicines (pain killers, antibiotics, ointments, etc.) from the medical shop.	2.2867	1.17203	37.4800	91.406	.050	.852
I have to wait long time in the hospital to get dental treatment.	1.5533	1.05891	38.2133	78.317	.772	.815
I face a long delay in getting appointments for treatment from government hospitals.	1.8467	1.24640	37.9200	76.598	.722	.815
I have to go to the dentist many times to complete my treatment.	1.8400	1.16481	37.9267	76.901	.766	.814
I don't fully understand what the dentist says.	2.0267	1.16979	37.7400	75.482	.839	.809
My dentist does not give all the available treatment options.	1.9000	1.10369	37.8667	76.895	.816	.812
I am facing confusion in selecting the best treatment choice for my condition as different dentists have been giving different opinions.	1.9867	1.20395	37.7800	76.938	.734	.815
I feel it would be better if my dentist communicate well.	1.2933	.81551	38.4733	82.479	.726	.821
I feel it would be better if my dentist is friendly and caring.	1.2867	.79711	38.4800	82.439	.748	.821

4.3.2.2. Test-retest reliability

We found Pearson's correlation (r) 0.90 between the total score of first and second observations. The accepted correlation (r) 0.6 and above for assessing the test-retest reliability. Considering test-retest results, we accepted all 17 items of the scale for further validity assessment. The test retest was done after further validation and item reduction. So, the number of items were reduced to 17. The results are shown in table 7.

Table 16 descriptive statistics and correlation of two measurements

Measurements	Total mean score of items	SD	Total number of observations	Pearson's correlation (r)
Measurement 1	62.07	.41206	30	.907**
Measurement 2	63.42	.47858	30	.907

Validation of scale

Considering psychometric characteristics of the scale- Cronbach's Alpha (α) = 0.84, Pearson's correlation (r) = 0.90 of test-retest, content validity index (CVI) = 0.90 and we accepted all 17 items and finalized the scale to assess barriers to utilization of dental services among older people. To do further validation of the scale factor analysis is done.

4.3.3. Further analysis of the scale

4.3.3.1.Factor analysis

We applied principal component analysis method. It was found that Kaiser-Meyer-Olkin (KMO) and Bertlett's test significant which meant that the set of the observations is adequate for factor analysis. But in communalities, the initial and extraction value of one item was found considerably low (<0.4), cumulative variance of initial eigenvalues 66.712% and all items were loaded on six factors. We applied the principal component analysis method which is the way of factor extraction where linear combinations of observed variables are formed. The extraction

of eigenvalues greater than one, maximum iterations for convergence was 99 and orthogonal rotation by method varimax.

The analysis showed significant KMO and Bertlett's test ($p<0.001$) (table 8), and communalities i.e. initial and extraction values (>0.4) of the total items. The total variance explained that the items were loaded on six factors with eigenvalues more than one (>1) and cumulative variance of initial eigenvalues 66.7%. Some items were loaded on more than one factor. We rotated items one by one and checked total items variance and factor loading. After factor analysis, we decided to remove the item "I wish there is someone to accompany me to the dental hospital", which showed a negative loading and cross loading. The factor six has only one factor loading so we removed that factor also. The remaining items loaded into five factors with eigenvalues more than one and cumulative variance of initial eigenvalues 67.16%. The rotated component matrix (Table 9,10,11,12 and Figure 2) showed five factors and single loading with suppressed small coefficient absolute value below 0.45. Scree plot also displayed five factors with eigenvalues greater than one.

The factor one consisted of eight items which shows the barriers related to dentist, the second factor showed two items which is the health issues of the older people. The factor three comprised of three items which illustrates the personal reasons. Similarly, the factor four contain two items which explains about laxity towards dental treatment. The factor five contains three items which explain the fear of dental procedures and home care taken to avoid treatment (table 9). Considering the results of factor analysis, we finalized 17 items for the scale and for measuring barriers in utilization of dental services and 7 items for measuring perceived oral health care needs.

Table 17 KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	1773.622
	df	153
	Sig.	.000

Table 18 communalities test of the items

	INITIAL	EXTRACTION
In my opinion dental treatment is expensive.	1.000	.517
There is no time for me to take dental treatment.	1.000	.623
Diseases like diabetes, hypertension, and other conditions prevent me from taking dental treatment.	1.000	.660
I have to take the advice from my doctor (cardiology, neurologist etc.) before undergoing any dental procedures.	1.000	.796
I don't need treatment for all the dental problems because I am able to manage with other existing teeth.	1.000	.427
I don't think I need treatment at this age	1.000	.758
I think dental care is not an emergency need.	1.000	.631
I am scared of dental injections	1.000	.286
I usually take traditional remedies (salt, cloves, eucalyptus oil etc) to relieve my tooth problems.	1.000	.568
When in tooth problems I get medicines (pain killers, antibiotics, ointments, etc.) from the medical shop.	1.000	.518
I have to wait long time in the hospital to get dental treatment.	1.000	.740
I have to go to the dentist many times to complete my treatment.	1.000	.760
I don't fully understand what the dentist says.	1.000	.854
My dentist does not give all the available treatment options.	1.000	.851
I am facing confusion in selecting the best treatment choice for my condition as different dentists have been giving different opinions.	1.000	.708
I feel it would be better if my dentist communicates well.	1.000	.837
I feel it would be better if my dentist is friendly and caring.	1.000	.847

Table 19 total variance explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.466	35.925	35.925	6.466	35.925	35.925	6.243	34.681	34.681
2	1.999	11.108	47.033	1.999	11.108	47.033	1.787	9.928	44.609
3	1.312	7.291	54.324	1.312	7.291	54.324	1.489	8.274	52.883
4	1.216	6.756	61.080	1.216	6.756	61.080	1.312	7.292	60.174
5	1.096	6.086	67.166	1.096	6.086	67.166	1.259	6.992	67.166
6	.961	5.339	72.505						
7	.888	4.933	77.438						
8	.839	4.660	82.098						
9	.746	4.147	86.245						
10	.519	2.884	89.129						
11	.443	2.462	91.591						
12	.334	1.857	95.699						
13	.261	1.448	97.147						
14	.235	1.303	98.451						
15	.206	1.147	99.598						
16	.059	.326	99.924						
17	.014	.076	100.000						

Extraction Method: Principal Component Analysis.

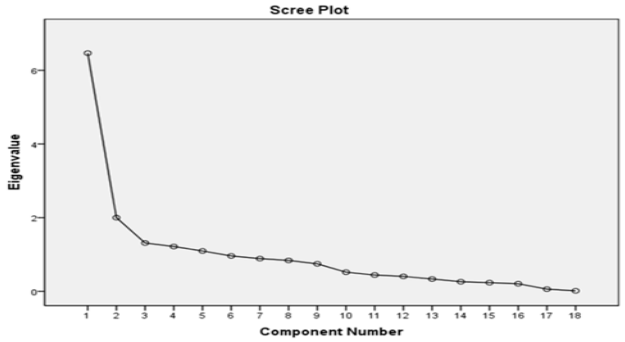


Figure 10: Rotated component matrix

Table 20 rotated component matrix

Items	Component				
	1	2	3	4	5
I feel it would be better if my dentist is friendly and caring.	.911				
My dentist does not give all the available treatment options.	.910				
I feel it would be better if my dentist communicates well.	.900				
I don't fully understand what the dentist says.	.872				
I have to go to the dentist many times to complete my treatment.	.858				
I am facing confusion in selecting the best treatment choice for my condition as different dentists have been giving different opinions.	.819				
I have to wait long time in the hospital to get dental treatment.	.818				
I have to take the advice from my doctor (cardiology, neurologist etc.) before undergoing any dental procedures.		.870			
Diseases like diabetes, hypertension, and other conditions prevent me from taking dental treatment.		.799			
There is no time for me to take dental treatment.			.704		
In my opinion dental treatment is expensive.			.649		
I don't need treatment for all the dental problems because I am able to manage with other existing teeth.			.609		
I don't think I need treatment at this age				.829	
I think dental care is not an emergency need.				.624	
I usually take traditional remedies (salt, cloves, eucalyptus oil etc) to relieve my tooth problems.					.698
When in tooth problems I get medicines (pain killers, antibiotics, ointments, etc.) from the medical shop.					.570
I am scared of dental injections					.435

Table 21 factor showing characteristics of domain

Factors	Domain
Factor 1	Pertaining to the dental professional
Factor 2	Pertaining to the general health of elderly
Factor 3	Personal constraints
Factor 4	Attitude towards dental care
Factor 5	Fear of dental care and adaptation to dental diseases

4.4. Perceived oral health care needs and barriers in utilisation of dental services.

We analysed the demographic and socio-economic characteristics of the respondents, perceived oral health care needs, utilization status of dental services, normative oral health care needs using WHO oral health assessment form respectively.

4.4.1. Background characteristics of respondents

Table 22 socio demographic and socio-economic characters of the population (n=399)

SI NO	Characteristics	Categories	Frequency n(%)
1.	Age (65.3± 5.5)	60-69 years	302 (76.2)
		70-79 years	88 (21.5)
		80-89 years	9 (2.2)
2.	Gender	Female	200 (50)
		Male	199 (50)
3.	Marital status	Unmarried	13 (3.3)
		Married	372 (92.3)
		Widow /widower	12 (3.0)
		Divorced	2 (0.5)
4.	Education status	Post-graduation	8 (2.0)
		Graduation	60 (14.8)
		Completed secondary education	64 (16.0)
		Competed matriculation	159(40.3)
		Primary education	107 (26.8)
		No formal education	1 (0.3)
5.	Occupation	Office work	44 (11.0)
		Skilled	41 (10.0)
		Semi-skilled	32 (8.3)
		Unskilled	128 (32.3)
		Presently Unemployed	154 (38.5)
6.	Income	AY	39 (9.8)
		BPL	208 (52.1)
		APL	152 (38.0)
7.	Systemic diseases	Present	274 (68.7)
8.	Consulting a doctor	Yes	264 (66.2)
9.	medicines for systemic diseases	Yes	259 (64.9)

4.4.2. Perceived oral health care needs

For convenience of analysis, the questionnaire on perceived oral health care needs and barriers in utilisation of dental services are divided into 3 domains. They are perception of oral health

needs and characteristic of last dental visit among the study subjects, personal barriers of the older people and barriers associated with dentist and dental treatment.

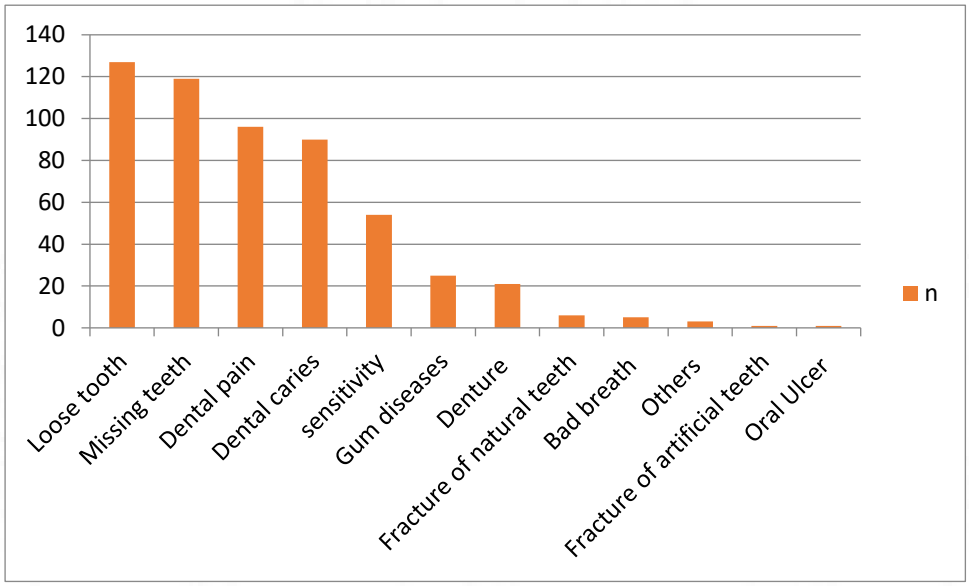
Table 23 perception of oral health needs and characteristic of last dental visit

	Components	Categories	Frequency n(%)
1.	Oral health problems in the past year (399) (1.03±0.7)	Yes	386 (96.7)
		No	13(3.3)
2.	Have you ever visited a dentist (399)	Yes	331(82.7)
		No	68(17)
3.	Past dental visit (n= 386) *	Up to one year	129 (33.4)
		From one year to five years	108 (27.9)
		From five years and above	77(19.9)
		I don't remember	17(4.4)
		I haven't visited a dentist	55(14.2)
4.	Reason for last dental visit (n=331) **	Routine dental check ups	7(1.7)
		To clean teeth	17 (4.2)
		To fill the teeth	34(8.5)
		To extract teeth	244(61)
		To place artificial teeth	24(6)
		Others	5(1.25)
5.	Where was the last dental visit (n=331) **	Private hospital	206(51.4)
		Government hospital (district hospital, CHC)	70(17.7)
		Government dental college	30(7.5)
		Private dental college	25(6.2)
6.	Major reason for visit to a particular centre (n=331) #	Affordable cost	96 (24.1)
		Easy to reach	168 (42.1)
		Familiar dentist	32 (8)
		Good service	26(6.5)
		Others	3(0.7)
7.	Accompaniment to the last dental visit (n=331) #	Went alone	68 (20.5)
		Someone to accompanied	263 (79.4)
8	Accompanying to dental hospital. (n=263)	spouse	113 (28.3)
		son/daughter	95(23.8)
		son/daughter in law	36(9)
		grand child	7(1.8)
		helper	3(0.8)
		others	9(2.3)

*denotes that 13 (3.3) subjects who doesn't have a dental problem at all are excluded in the further analysis. ** denotes that 68(17) subjects includes people who do not have a dental visit in their life time and people with no dental problems. # denotes the reason ranked highest by the subjects was chosen as the major reason.

The past dental visit among participants were maximum in the past one year 129(33.4).. More than half of the participants 244(61) had visited a dentist to extract their teeth and 7(1.7) had visited the dentist for their routine dental check-up. 206(51.4) participants had visited a private clinic to receive dental care and 70(17.7) had visited a government facility to take dental care. The main reasons for visiting a particular centre among the participants were accessibility 168(42.2) and the least reported reason was familiarity of the dentist 32(8).

Figure 11 prevalence of perceived oral health care needs among study participants



The participants perceived oral health care needs reported by the participants were loose tooth 127(31.8), followed by missing teeth 119(29.8), dental pain 96(24.1) and the least reported oral disease is oral ulcers 1(0.3).

Table 24 rank order of perception regarding barriers in accessing of dental services

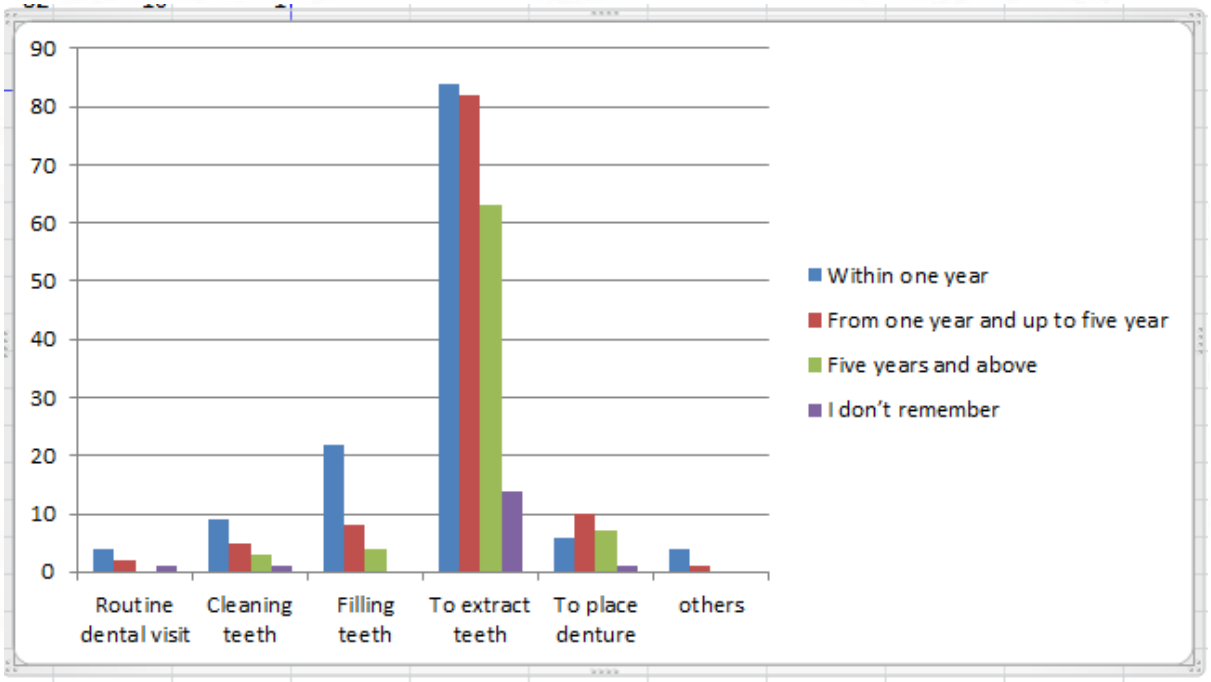
A	**Personal barriers of older people (n=386)***		
1	I don't need dental treatment for the entire dental problem because I am able to manage with other existing teeth.	Strongly agree/agree	343(86)
2	In my opinion dental treatment is expensive.	Strongly agree/agree	309 (77.4)
3	I usually take traditional remedies (salt, cloves, eucalyptus oil etc) to relieve my tooth problems.	Strongly agree/agree	297(76.9)
4	I don't think I need treatment at this age	Strongly agree/agree	276(71.5)
5	I think dental care is not an emergency need.	Strongly agree/agree	265(68.6)
6	There is no time for me to take dental treatment	Strongly agree/agree	261(65.5)
7	When in tooth problem I get medicines (pain killers, antibiotics, ointment etc) from medical shop.	Strongly agree/agree	250(64.7)
8	Diseases like diabetes, hypertension and other conditions prevent me from taking dental treatment	Strongly agree/agree	253(63.4)
9	I am scared of dental procedures.	Strongly agree/agree	203(52.5)
10	I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental procedure.	Strongly agree/agree	112(28.1)
B	**Barriers associated with dental and dental treatment (n=331)#**		
1	I feel it would be better if my dentist is caring and friendly.	Strongly agree/agree	327 (98.7)
2	I feel it would be better if my dentist communicates well.	Strongly agree/agree	327 (98.7)
3	I have to wait long time in the hospital to get dental treatment.	Strongly agree/agree	262 (79.1)
4	My dentist does not give all the available treatment options.	Strongly agree/agree	225 (67.9)
5	I am facing confusion in selecting the best treatment choice for my condition as different dentists have been giving different treatment options.	Strongly agree/agree	223 (67.3)
6	I have to go to the dentist many times to complete my treatment	Strongly agree/agree	218 (65.8)
7	I don't fully understand what my dentist says	Strongly agree/agree	212 (64)

*excluded people who do not have a dental problem, # excluded people who do not have a dental problem and who do not have a dental visit in their life time.

The questionnaire barriers in utilisation of dental services were divided into 2 main domains. They are personal barriers of the older people and barriers associated with dentist and dental treatment. The responses of the participants were recorded and ranked based on the barriers they faced. The main barrier that prevented people from taking oral health care was their adaptation to the present health situation 343(86), followed by dental treatment is expensive 309(77.4) and the least reported barrier is getting the advice from the physician 112(28.1).

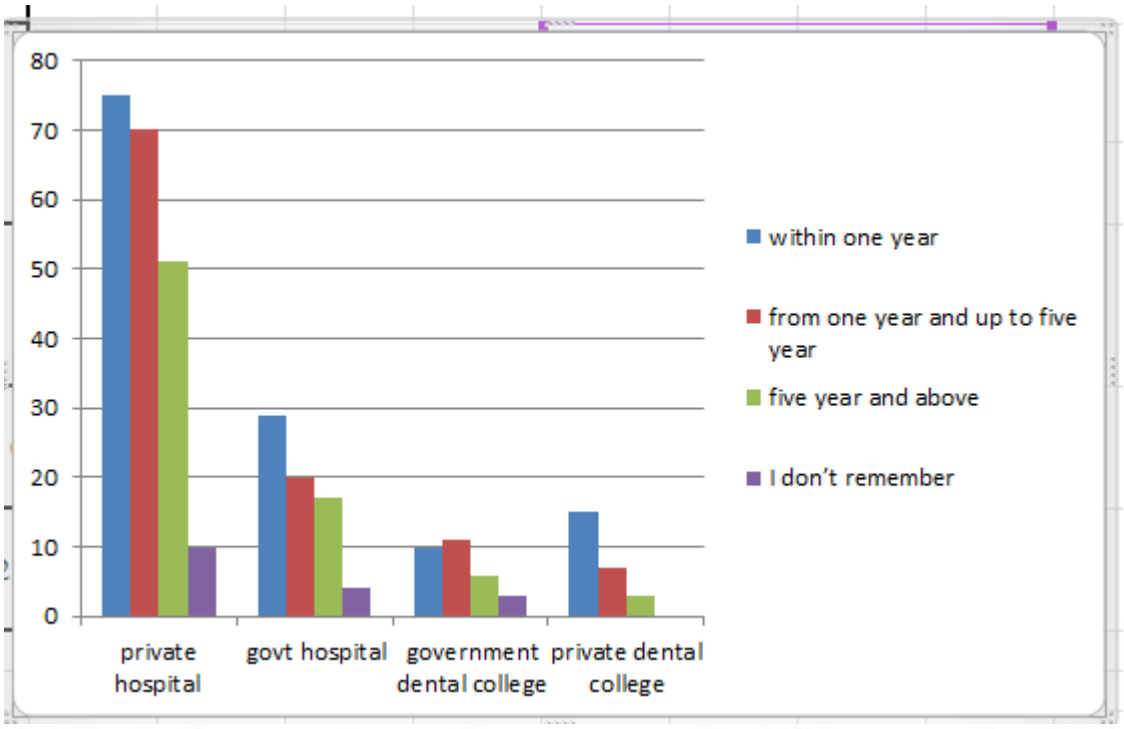
The most reported barriers associated with dentist and dental treatment are people wish for caring and friendly dentist and they wish their dentist to communicate well 327(98.7) followed by long waiting hours 262(79.1) and the least reported barrier is lack of understanding of the scientific terms and treatment options explained by dentist 212(64).

Figure 12 History of last dental visit and purpose of visit



The association between last dental visit and purpose of visit showed that majority of the participants had visited a dentist to extract their teeth 243(73.1) the results showed 84(65.1), 82 (75), 63(81) had visited the dentist within one year, from one year and up to five years and from five years and above respectively.

Figure 13 History of last dental visit and place of visit



Most of the people had taken dental care from a private practitioner 206(62.2) followed by government hospital 70(21.1) and the least number of visits was done in a private dental college 25(7.5).

Table 25 Association between socio-demographic characters perceived need, perceived pain, dental caries, loose teeth, sensitivity, gum diseases and missing teeth.

Sino	Variables	**Perceived need Present (n=386)**		**Perceived pain (n= 96)**		**Dental caries (n=90)**		**Loose tooth (n=127)**		**Sensitivity (n=54)**	
		n(%)	**p value**	**n(%)**	**p value**	**n(%)**	**p value**	**n(%)**	**p value**	**n(%)**	**p value**
1	**Age category**				.216				.000***		
	60-69	291(96.4)		73(24.1)		71 (23.5)	.243	80 (26.4)		45 (14.9)	.366
	70-79	86 (97.7)	.699	23(26.1)		19 (21.5)		43 (48.8)		8 (9.1)	
	80-89	9 (100)		0		0		4 (44.4)		1 (11.1)	
2	**Gender**				.214				.271		
	Female	195 (97.5)	.254	52(26)		34 (17)	.005*	67 (33.5)		26 (13)	.434
	Male	191(95.9)		44(22.1)		56 (28.1)		60(30.1)		28 (14)	
3	**Marital status**				.269				.362		
	Married	373(96.6)	.646	94 (24.3)		86 (22.2)	.333	124		53 (13.7)	.455
	Unmarried	13(3.3)		2 (15.3)		4 (30.7)		(32.1)		1 (7.6)	
								3 (23)			
4	**Education**				.460						
	Above matriculation	264 (98.8)	.377	33 (26.4)		34 (27.2)	.086	41 (32.8)	.432	23 (18.4)	.041*
	Below matriculation	122(92.4)		63(22.9)		56 (20.4)		86 (31.3)		31 (11.3)	
5	**Work**				.489						
	Skilled worker and above	84(98.8)	.196	21 (24.7)		21 (24.7)		26 (30.5)	.446	12 (14.1)	
	Semi-skilled worker and below	302 (96.17)				69 (21.9)	.344	101		42 (13.3)	.490
				75 (23.8)				(32.1)			
6	**Income**				.400				.401		
	APL	149 (98)	.202	61(24.6)		53 (21.4)		77 (31.1)		31 (12.5)	.279
	BPL and below	237 (95.9)		35 (23)		37 (24.3)	.291	50 (32.8)		23 (15.1)	
7	**Last dental visit**				.012*						
	No dental visit/do not remember	17 (56.7)/30	.000***	94 (25.5)		85 (23)	.291	121(32.8)	.104	54 (14.6)	.024*
	Had dental visit before	369		2 (6.7)		5 (16.7)		6 (20)		0	
		(100)/369									

Table 25 continued……

Variables	Missing teeth (n=119)		Gum problems (n=25)	
	n(%)	p value	n(%)	p value
Age category (n=399)				.608
60-69	82 (27.1)	.017*	17 (5.6)	
70-79	31 (35.2)		7 (7.9)	
80-89	6 (66.6)		1 (11.1)	
Gender				.345
Female	63 (31.5)	.266	14 (7)	
Male	56 (28.1)		11 (5.5)	
Marital status		.158		
Married	113 (29.2)		25 (6.4)	.425
Unmarried	6 (46.1)		0	
Education				
Above matriculation	32 (25.6)	.129	8 (6.4)	.549
Below matriculation	87 (31.7)		17 (13.6)	
Work				
Skilled worker and above	23 (27)	.313	6 (7)	
Semi-skilled worker and below	96 (30.5)		19 (6)	.448
Income				
BPL and below	78 (31.5)	.194	12 (4.8)	.104
APL	41 (26.9)		13 (8.5)	
Last dental visit in one year				
Present	23 (17.8)	.000***		.143
Absent	96 (35.6)		11 (8.5)	
			14 (5.2)	

** p value significant at <0.05,*

**** p value significant at <0.001*

The results showed no significant association between perceived oral health care needs and socio demographic details. However, there were significant association between ($p<0.000$) last dental visit and perceived oral health care needs. There were no significant association in age, gender, marital status, education, work, income in perceived pain and an association is seen between last dental visit ($p<0.012$) and perceived dental pain. Likewise, no significant association is seen in age, gender, marital status, education, work, income in sensitivity and a significant association is seen in last dental visit ($p<0.024$) and perceived sensitivity.

A significant association was seen between gender ($p<0.005$) and dental caries. Likewise, an association is seen between age ($p<0.000$) and loose tooth. A significant association is seen between last dental visit in one year ($p<0.000$) and missing teeth

4.4.3. Barriers in utilisation of dental services

The association between socio demographic details and barriers in utilisation of dental services shows a significant association ($p<0.008$) between age and *I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental procedure*. As age increases people are more prone for systemic diseases and their complications. Taking dental treatment without consent from the treating physician is difficult. So, as age increases people have to get consent from physician for every dental procedure.

An association is also seen between education and *I don't need treatment for all the dental problems because I am able to manage with other existing teeth* ($p<0.010$) and *I don't think I need treatment at this age* ($p<0.013$). Dental literacy is an important factor to maintain proper oral health. So, people with lower levels of education tends to manage their oral health problems by their own and thinks taking dental treatment at this age is not essential. As the level of education decreases the barriers increases.

There is an association found between work and *I don't think I need treatment at this age* ($p<0.013$) and *I think dental care is not an emergency need* ($p<0.010$). Most of the participants are presently unemployed or unskilled worker. So, as the work category goes down people the tendency to take dental treatment goes down.

A significant association between income and *in my opinion dental treatment is expensive* ($p<0.001$), *Diseases like diabetes, hypertension and other conditions prevent me from taking dental treatment* ($p<0.010$) and *I think dental care is not an emergency need* ($p<0.020$). As the income decreases the utilisation of dental services also decreases and people tends to take

dental treatment only in case of acute pain and they don't consider dental treatment as emergency need.

Last dental visit within one year has significant association with *I have to take advice from my doctor (cardiologist, neurologist etc) before undergoing any dental procedure* ($p<0.008$), *I don't need treatment for all the dental problems because I am able to manage with other existing teeth* ($p<0.019$) and an association between *I don't think I need treatment at this age* ($p<0.033$) and *I think dental care is not an emergency need* ($p<0.031$).

Table 26 last dental visit and socio-demographic details

Variables	Last dental visit (**n=386**)				
	≤ 1year	1 year and up to 5 years	≥ 5 year	no dental visit	I don't remember
Age category					
60-69	103(35.3)	84(28.8)	54(18.5)	36(12.3)	14(4.8)
70-79	25(29)	22(25.5)	19(22)	17(19.7)	3(3.4)
80-89	1(11.1)	2(22.2)	4(44.4)	2(22.2)	0
Gender					
Female	67(34.3)	53(27.1)	41(21)	26(13.3)	8(4.1)
Male	62 (32.4)	55(28.7)	36(18.8)	29(15.1)	9(4.7)
Marital status					
Married	124(33.2)	106(28.4)	75(20.1)	54(14.4)	14(3.7)
Unmarried	5(38.4)	2(15.8)	2(15.8)	1(7.6)	3(23)
Education					
Above matriculation	42(34.4)	34(27.8)	26(21.3)	4(3.2)	16(13.1)
Below matriculation	87(32.9)	74(28)	51(19.3)	13(4.9)	39(14.7)
Work					
Skilled worker and above	31(36.9)	24(28.5)	15 (17.8)	12(14.2)	2(2.3)
Semi-skilled worker and below	98(32.4)	84(27.8)	62(20.5)	43(14.2)	15(4.9)
Income					
APL	52(34.8)	45(30.2)	32(21.4)	17(11.4)	3(2)
BPL and below	77(32.4)	63(26)	45(18.9)	38(16)	14(5.9)

The result depicts that as age increases the number of visits to dentist decreases. A relationship is seen between no dental visit and income. People belonging to BPL group have 16% no dental visit compared to APL group of 11.4%.

4.4 Gap between perceived oral health care needs and normative oral health care needs

Table 27 Perceived need for treatment of tooth decay versus clinically diagnosed dental caries

Perceived need for treatment of tooth decay	Clinically assessed dental caries		Total
	Present	Absent	
Yes	60 (66.7)	30 (33.3)	90
No	138 (44.7)	171 (55.3)	309
Total	198	201	399

Of the 90 people who reported tooth decay, only 60 (66.7%) had true dental caries and 30 (33.3%) had wrongly perceived the need for treatment for tooth decay which was not clinically present; of 309 people who reported that they do not have tooth decay 171 (55.3%) were truly free of tooth decay but 138(44.7%) who had dental caries did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed tooth decay.

Table 28 Perceived need for treatment of gum diseases versus clinically diagnosed Gingivitis

Perceived need for treatment of gum diseases	Clinically assessed gingivitis		Total
	Present	Absent	
Yes	12(48)	13(52)	25
No	170(45.5)	204(54.5)	374
Total	182	217	399

The perceived need for treatment of gum diseases versus clinically diagnosed gingivitis showed that Of the 25 people who reported gum diseases, only 12 (48%) had true gingivitis while 13 (52%) had wrongly perceived the need for treatment for gingivitis which was not clinically present; of 374 people who reported that they do not have bleeding gums 204 (54.5%) were

truly free of clinically diagnosed gingivitis but 170(45.5%) who had bleeding gums did not perceive the need for treatment.

Table 29 Perceived need for treatment of loose teeth versus clinically assessed periodontitis

Perceived need for treatment of loose teeth	Clinically assessed periodontitis		Total
	Present	Absent	
Yes	82 (64.6)	45 (35.4)	127
No	44 (16.2)	228 (83.8)	272
Total	126	273	399

The perceived need for treatment of loose tooth versus clinically diagnosed periodontitis showed Of the 127 patients who reported loose teeth, only 82 (64.6%) had clinically diagnosed periodontitis while 45 (35.4%) had wrongly perceived the need for treatment for periodontitis which was not clinically present; of 272 people who reported that they do not have loose teeth 228 (83.8%) were truly free of clinically diagnosed periodontitis but 44(16.2%) who had periodontitis did not perceive the need for treatment.

Table 30 Perceived need for treatment of sensitivity versus clinically assessed wasting disease

Perceived need for treatment of sensitivity	Clinically assessed wasting disease		Total
	Present	Absent	
Yes	30 (55.6)	24 (44.4)	54
No	155 (44.9)	190 (55.1)	345
Total	185	214	399

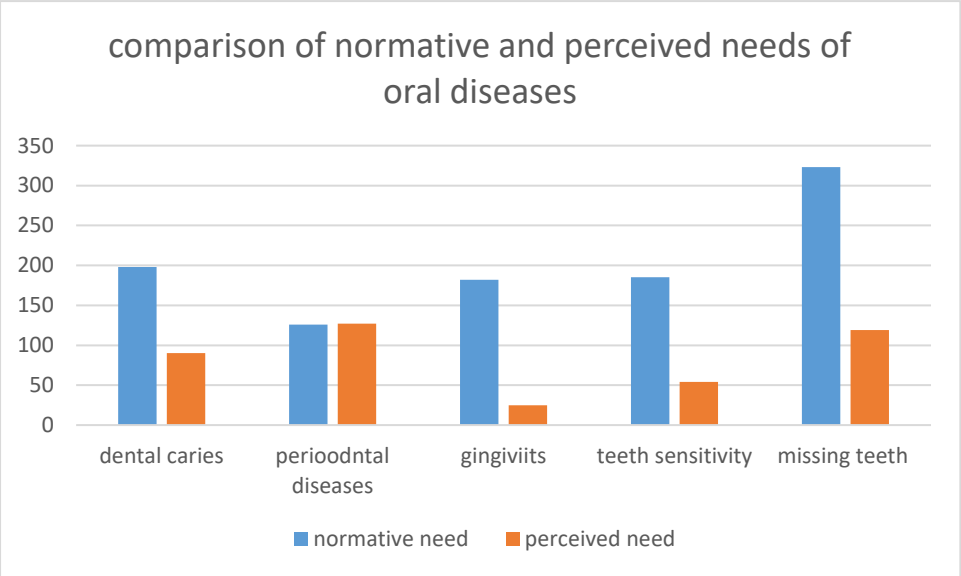
The perceived need for treatment of teeth sensitivity versus clinically diagnosed wasting disease showed Of the 54 people who reported teeth sensitivity, only 30 (55.6%) had clinically diagnosed wasting disease while 24(44.4%) had wrongly perceived the need for treatment for wasting disease which was not clinically present; of 345 people who reported that they do not have sensitivity 190 (55%) were truly free of clinically diagnosed wasting diseases but 155 (44.9%) who had teeth sensitivity did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed wasting disease.

Table 31 differences in perceptions and clinical diagnosis

Dental diseases	Difference between perceptions X clinical measures (%)
Dental caries	42.1
Gingivitis	45.8
Periodontitis	22.3
Wasting disease	44.8

The differences in perception of dental diseases and clinical measures show 42% for dental caries, 45.8% for gingivitis and 44.8% for wasting diseases. A lower percentage is found for periodontitis 22.3.

Figure 14: Comparison of normative oral health care needs and perceived oral health care needs



4.5 Normative oral health assessment using WHO oral health assessment form-2013

Table 32: mean number of decayed teeth (dt) per person; mean number of missing teeth person (mt); mean number of filled teeth (ft) per person; mean number of teeth with caries experience per person

	Variable	Mean	SD
1	Decayed teeth (dt)	1.30	1.96`
2	Missing teeth (mt)	7.39	8.55
3	Filled teeth (ft)	0.12	0.65
4	DMFT	8.78	8.38

The mean DMFT was 8.78 (SD = 8.38). The major portion, of the caries experience was missing teeth with mean 7.39, while decay and filled teeth accounted for 1.30 ± 1.96 and 0.12±0.65, respectively.

Table 33 mean and standard deviation of DMFT according to socio demographic details

Sino	Socio demographic details	DMFT score
1	**Gender**	
	Male mean SD	8.30 (8.4)
	Female mean SD	9.27 (8.2)
	t-test p value	0.74
2	**Marital status**	
	Married mean SD	8.72 (8.3)
	Unmarried mean SD	10.69 (9.3)
	t-test p value	0.80
3	**Education**	
	Above matriculation mean SD	8.47 (7.8)
	Below matriculation mean SD	8.93 (8.63)
	t-test p value	0.61
4	**Work**	
	Skilled worker and above mean SD	7.48 (7.4)
	Semi-skilled worker and below mean SD	9.14 (8.5)
	t-test p value	0.10
5	**Income**	
	APL mean SD	7.74 (7.7)
	BPL and below mean SD	9.43 (8.7)
	t-test p value	0.05
6	**Last dental visit**	
	No dental visit/do not remember mean SD	8.74 (8.3)
	Had dental visit before mean SD	9.33 (8.4)
	t-test p value	0.71

This table shows mean DMFT score and socio demographic details there was no significant relationship found between gender, marital status, education and work. There was a significant relationship between income and DMFT ($p<0.05$).

Table 34: mean number of permanent teeth, teeth with gingival bleeding and teeth with periodontal pocket

SINO	Title	Variable	Mean
1	Mean number of permanent teeth present per person	Mean number of permanent teeth per person	24.28
2	Mean number of teeth with gingival bleeding	mean number of teeth with gingival bleeding	14.38
3	Mean number of teeth with periodontal pocket	Mean number of teeth with periodontal pocket	3.13

The mean number of permanent teeth per person is 24.2 and the mean number of people with gingival bleeding and periodontal pocket is 14.3 and 3.13 respectively.

Table 35: Tables according to WHO oral health assessment

SINO	Title	Variable	Percentage
2	Number and percentage of subjects who have or have had caries of the permanent dentition; number and percentage of subjects with untreated dental caries	Subjects who have or have had caries of permanent teeth. Subjects with untreated caries.	209(52.4) 198(49.6)
3	Number and percentage of subjects with and without natural teeth.	People with natural teeth People without natural teeth	377(94.5) 22(5.5)
4	Number and percentage of subjects with healthy periodontal conditions.	People with healthy periodontal conditions	273(68.4)
5	Number and percentage of subjects with gingival bleeding.	People with gingival bleeding	182(45.6)
6	Number and percentage of subjects with periodontal pockets greater than or equal to 6 mm	People with pocket(≥6mm)	91(22.9)
8	Number and percentage of teeth present with pockets (4-5mm)	Number and percentage of teeth present with pockets (4-5mm)	117(31)
9	Number and percentage of subjects with sensitivity (wasting disease)	Sensitivity	184(48.8)
10	Number and percentage of subjects with no abnormalities of oral mucosa; number and per cent of subjects with oral mucosal lesions.	No abnormalities in oral mucosa Oral mucosal lesions present.	390(97.7) 9(2.3)
11	Number and percentage of subjects with removable denture(s) in the upper and lower arch.	Partial denture in upper arch Partial denture in lower arch Complete denture in upper arch Complete denture in lower arch	10(2.5) 16(4) 16(4) 14(3.5)

The results show 377(94.5) people with natural teeth. The number of people with untreated dental caries is 198(5.5). There are 273 (68.4) people with healthy periodontal condition. The number of people with gingival bleeding is182 (45.6) and 91 (22.9) people had periodontal pocket during examination.

There are 10(2.5) percentage of people with partial denture in the upper arch and 16(4) percentage of people with partial denture in lower arch.

Table 36 association between clinically assessed dental diseases and socio demographic details

Sino	Variables	Dental caries (n=198)		Missing teeth (n= 323)		Gingivitis (n=182)		periodontitis (n=126)		Sensitivity (n=54)	
		n(%)	p value	n(%)	p value	n(%)	p value	n(%)	p value	n(%)	p value
1	**Age category**		**.027**		.528				.131		.094
	60-69	158 (52.3)		247(81.8)		147(48.7)	.065	91(30.1)		144(47.7)	
	70-79	39 (44.3)		68(77.3)		33(37.5)		34(38.6)		40(45.5)	
	80-89	1 (11.1)		8(88.9)		2(22.2)		1(11.1)		1(11.1)	
2	**Gender**		880		.070				.141		.176
	Female	100 (50)		169(85.5)		83(41.5)	.098	70(35)		86(43)	
	Male	98 (49.2)		154(77.4)		99(49.7)		56(28.1)		99(49.7)	
3	**Marital status**		.511		.707				.587		.265
	Married	6 (46.2)		313(81.1)		176(45.6)	.968	121(31.3)		177(45.9)	
	Unmarried	192 (49.7)		10(76.9)		6(46.2)		5(38.5)		8(61.5)	
4	**Education**		.455		.824				.732		.658
	Above matriculation	137 (50)		102(81.6)		61(48.8)	.388	38(30.4)		60(48)	
	Below matriculation	61 (48.8)		221(80.7)		121(44.2)		88(32.1)		125(45.6)	
5	**Work**		.126		.711				.628		.106
	Skilled worker and above	161 (51.4)		70(82.4)		43(50.6)	.299	25(29.4)		46(54.1)	
	Semi-skilled worker and below	37 (43.5)		253(80.6)		139(44.3)		101(32.2)		139(44.3)	
6	**Income**		.345		.591				.657		.921
	APL	125 (50.6)		202(88.1)		12(30.7)	**.05**	46(30.3)		115(46.6)	
	BPL and below	73 (48)		121(79.6)		169(47.07)		80(32.4)		70(46.1)	
7	**History of dental visit**		.308				.318		.489		.318
	No dental visit/do not remember	75(46.3)		206(86.9)	**.000**	80(49.4)		48(29.6)		80	
	Had dental visit before	123(51.9)		117(72.2)		110(46.4)		78(32.2)		105	

The results showed no significant association between clinically assessed need or normative need and work, education and marital status. However, there were significant association between ($p<0.02$) age and dental caries. There was significant association in income and clinically assessed need ($p<0.05$).

There is no signification association found between last dental visit and dental caries, gingivitis and sensitivity. But an association was found between last dental visit and missing teeth ($p<0.00$).

4.6 Oral health related quality of life assessment using GOHAI questionnaire

Table 37 oral health related quality of life

Questions	Always/often	Sometimes/seldom	never	mean	SD
How often did you limit the kind or amount of food you eat because of problems with your teeth or dentures?	162 (40.5)	153 (38.5)	84 (21)	1.80	0.76
How often did you have trouble biting or chewing different kinds of food, such as firm meat or apple?	152(38)	160(40)	87(21.8)	1.84	0.75
How often were you able to swallow comfortably?	176(44)	165(41.5)	58(14.5)	1.70	0.70
How often have your teeth or dentures prevented you from speaking the way you wanted?	107(26.8)	188(47.3)	104(26)	1.99	0.72
How often were you able to eat anything without feeling discomfort?	178(44.5)	161(40.5)	60(15)	1.70	0.71
How often did you limit contacts with people because of the condition of your teeth or dentures?	105(26.3)	189(47.3)	105(26.3)	2.05	1.19
How often were you pleased or happy with the looks of your teeth and gums or dentures?	162(40.5%)	163(41)	74(18.5)	1.78	0.73
How often did you use medication to relieve pain or discomfort from around your mouth?	137(34.3)	206(51.7)	55(13.8)	1.80	0.67
How often were you worried or concerned about the problems with your teeth, gums or dentures?	139(34.8)	194(48.9)	65(16.3)	1.81	0.69
How often did you feel nervous or self- conscious because of the problem with your teeth, gums or dentures?	113(28.2)	209(52.5)	77(19.3)	1.91	0.68
How often did you feel uncomfortable eating in front of people because of problems with your teeth or dentures?	109(27.3)	215(54)	75(18.8)	1.91	0.67
How often were your teeth or gums sensitive to hot, cold or sweet?	215(53.8)	130(32.8)	54(13.5)	1.60	0.71

The GOHAI questionnaire consisted of 12 questions with three dimensions psychosocial, physical and pain/discomfort. The frequency and distribution of all items in the physical dimension describes that 40% of all the respondents always or often limited the kind or amount of food they eat because of problems with their teeth or dentures (item 1), forty per cent of the respondents sometimes/seldom had trouble biting or chewing different kinds of food, such as firm meat or apple (item 2), 44% of respondents always /often were able to swallow comfortably (item 3), forty seven per cent of the respondent always/often their teeth or dentures prevented them from speaking the way you wanted (item 4).

In the psychosocial dimension forty seven per cent sometimes/seldom responded that their teeth or dentures prevented them from speaking the way they wanted (item 6), 41% responded sometimes/seldom that they were pleased or happy with the looks of their teeth and gums or dentures (item 7), 48.9% ,52.5% and 54% had responded that sometimes/seldom they were worried or concerned about the problems with their teeth, gums or dentures (item 9), they feel nervous or self- conscious because of the problem with their teeth, gums or dentures (item 10) and they were feeling uncomfortable eating in front of people because of problems with their teeth or dentures (item 11) respectively.

In the pain/discomfort dimension 44.5% of respondents always/often were able to eat anything without feeling discomfort (item 5), 51.7% of the respondent sometimes/seldom were using medication to relieve pain or discomfort from around their mouth (item 8) and 53.8% of respondents sometimes/seldom they were sensitive to hot, cold or sweet food (item 12).

Table 38 mean and standard deviation for GOHAI dimensions according to socio demographic details

Socio demographic details		Psychosocial	Pain	Physical
Gender				
Male	mean (SD)	1.90 (0.4)	1.69 (0.3)	1.80 (0.52)
Female	mean (SD)	1.88 (0.4)	1.70 (0.4)	1.86 (0.5)
t-test	p-value	0.49	0.43	0.23
Marital status				
Married	mean (SD)	1.89 (0.4)	1.69 (0.3)	1.84 (0.5)
Unmarried	mean (SD)	1.89 (0.4)	1.89 (0.4)	1.65 (0.5)
t-test	p-value	0.40	0.16	0.64
Income				
Above BPL	mean (SD)	1.93 (0.4)	1.66 (0.3)	1.86 (0.5)
BPL and below	mean (SD)	1.86 (0.3)	1.72 (0.3)	1.81 (0.5)
t-test	p-value	0.41	0.49	0.54
Education				
Above tenth	mean (SD)	1.93 (0.3)	1.70 (0.3)	1.84 (0.5)
Tenth and below	mean (SD)	1.87 (0.4)	1.69 (0.3)	1.82 (0.5)
t-test	p-value	0.04*	0.97	0.62
Last dental visit in one year				
Visit in one year		1.88 (0.3)	1.65 (0.3)	1.81 (0.4)
Visit more than a year		1.89 (0.4)	1.71 (0.4)	1.84 (0.5)
t-test		0.52	0.04*	0.47

* P value significant at <0.05

The mean score for physical dimension in males was 1.80 (0.52) and in females was 1.86 (0.5). The mean score for psychosocial dimension among males was 1.90 (0.4) and among females was 1.88 (0.4). The mean score for pain/discomfort among males was 1.69 (0.3) and among females was 1.70 (0.4).

The mean score for psychosocial dimension among married was 1.89 (0.4) and for unmarried was 1.89 (0.4). The mean score value for physical domain among married and unmarried is 1.84 (0.5) and 1.65 (0.5) respectively. The mean score for pain/discomfort dimension is 1.69 (0.3) and 1.89 (0.4) for married and unmarried respectively.

The mean score for physical dimension for education was 1.84 (0.5) and 1.82 (0.5) for education above tenth and education below tenth respectively. The mean score for pain dimension is 1.70 (0.3) and 1.69 (0.3) respectively for education above tenth and below tenth respectively. The mean score for psychosocial dimension is 1.93 (0.3) and 1.87 (0.4)

respectively for education above tenth and education below tenth. A significant association was seen between psychosocial dimension and income (p<0.04).

The mean score for physical dimension for past dental visit in one year was 1.81(0.4) and 1.84 (0.5) is visit in one year and visit in more than a year respectively. The mean score for pain dimension is 1.65 (0.3) and 1.71(0.4) for visit in one year and visit in more than one year respectively. The mean score for psychosocial dimension is 1.88 (0.3) and 1.89 (0.4) for visit in one year and visit in more than a year respectively. A significant association was found between pain dimension and last dental visit in one year.

Table 39: mean and standard deviation of GOHAI according to normative needs

Normative needs	Psychosocial	Pain	Physical
Dental caries			
Present	1.91 (0.4)	1.64 (0.3)	1.82 (0.4)
Absent	1.87 (0.3)	1.74 (0.4)	1.83 (0.5)
p value	0.41	0.01*	0.84
Gingivitis			
Present	1.88 (0.3)	1.62 (0.3)	1.91 (0.4)
Absent	1.89 (0.4)	1.76 (0.4)	1.77 (0.5)
p value	0.82	0.001***	0.006*
Missing teeth			
Present	1.86 (0.4)	1.69 (0.3)	1.78 (0.4)
Absent	2.01 (0.4)	1.71 (0.4)	2.04 (0.5)
p value	0.008*	0.79	0.000***
Prosthesis			
Present	1.82 (0.3)	1.92 (0.4)	1.70 (0.3)
Absent	1.89 (0.4)	1.68 (0.3)	1.84 (0.5)
p value	0.65	0.16	0.02*
Periodontitis			
Present	1.80 (0.3)	1.73 (0.3)	1.62 (0.4)
Absent	1.93 (0.4)	1.68 (0.3)	1.93 (0.4)
p value	0.007*	0.22	0.000***
Sensitivity			
Present	1.89 (0.4)	1.61 (0.3)	1.88 (0.5)
Absent	1.88 (0.4)	1.77 (0.4)	1.79 (0.4)
p value	0.82	0.000***	0.09

* P value significant at <0.05, *** P value significant at <0.001

The mean score for physical dimension in people with dental caries was 1.82 (0.4) and in non-carious was 1.83 (0.5). The mean score for psychosocial dimension among people with dental caries was 1.91 (0.4) and among non-carious was 1.87 (0.3). The mean score for pain/discomfort among caries subjects was 1.64 (0.3) and among non-carious was 1.74 (0.4). There was a significant association between pain/discomfort dimension and dental caries.

The mean score for psychosocial dimension among people with gingivitis was 1.88 (0.3) and among people without gingivitis was 1.89 (0.4). The mean score for pain/discomfort among people with gingivitis was 1.62 (0.3) and among people without gingivitis was 1.79 (0.4). The mean score for physical dimension in people with gingivitis was 1.91(0.4) and in people without gingivitis was 1.77 (0.5). An association was found between pain ($p<0.001$) and physical dimensions ($p<0.006$).

The mean score for physical dimension in people with missing teeth was 1.78 (0.4) and in people without missing teeth were 2.04 (0.5). The mean score for psychosocial dimension among people with missing teeth was 1.86 (0.4) and among people without missing teeth were 2.01 (0.3). The mean score for pain/discomfort among people with missing teeth was 1.69 (0.3) and among people without missing teeth were 1.71(0.3). An association was found between psychosocial ($p<0.008$) and physical dimensions ($p<0.000$) and missing teeth.

The mean score for pain/discomfort among people with dentures was 1.92 (0.4) and among people without dentures was 1.68 (0.4). The mean score for physical dimension in people with dentures was 1.70 (0.3) and in people without dentures were 1.84 (0.5). The mean score for psychosocial dimension among people with dentures was 1.82 (0.4) and among people without dentures were 1.89 (0.4). An association was found between) and physical dimensions ($p<0.02$) and denture wear.

The mean score for physical dimension in periodontitis was 1.62 (0.4) and in people without periodontitis were 1.93(0.4). The mean score for psychosocial dimension among people with periodontitis were 1.80 (0.3) and among people without periodontitis were 1.93 (0.4). The mean score for pain/discomfort among people with periodontitis were 1.73 (0.3) and among people without periodontitis were 1.68 (0.3). An association was found between psychosocial ($p<0.007$) and physical dimensions ($p<0.000$) and periodontitis.

The mean score for psychosocial dimension among people with sensitivity was 1.89 (0.4) and among people without sensitivity were 1.88 (0.4). The mean score for physical dimension in people with sensitive teeth was 1.88 (0.4) and in people without sensitive teeth were 1.79 (0.4). The mean score for pain/discomfort among people with sensitive teeth was 1.61(0.5) and among people without sensitive teeth was 1.77 (0.4). An association was found between pain dimension ($p<0.000$) and teeth sensitivity.

4.7 Multivariate Logistic Regression

A multivariate analysis was undertaken to evaluate the relationship of the variables that demonstrated some significance with last dental visit. The following results were revealed as according to Table 25.

Table 40 multivariate logistic regression demonstrating association between key variables and last dental visit

Variable	B	S.E	Wald	df	Sig.	Exp(B)	95%CI for EXP(B)	
							Lower	Upper
Income	-.994	.379	6.871	1	.009	.370	.176	.778
Systemic diseases	-.757	.264	8.201	1	.004	.469	.279	.788

The relationship between last dental visit and income has significance, $p<0.009$. The relationship between systemic diseases and last dental visit shows a significance of $p<0.004$. Those who had good income (APL) were more likely to have a dental visit than other groups.

Table 41 multivariate logistic regression demonstrating association between key variables and perceived oral health care needs

Variable	B	S.E	Wald	df	Sig.	Exp (B)
Dental caries	1.375	.667	4.244	1	.039*	3.954
Missing teeth	-1.176	.671	3.072	1	.080	.308
Filled teeth	-18.794	7807.246	.000	1	.998	.000
Gingivitis	-1.621	.802	4.083	1	.043*	.198
Periodontitis	.214	.739	.084	1	.772	1.239
Denture wear	.921	1.153	.638	1	.424	2.512
Teeth sensitivity	1.551	.710	4.773	1	.029*	4.716
Constant	21.431	7807.246	.000	1	.998	2029793518.097

The relationship between perceived oral health care needs and normative oral health care needs demonstrates a significant association between dental caries and perceived need $p<0.04$. This shows that people with dental caries are 4 times more perceived need than people without dental caries. A significant association was seen between perceived need and gingivitis $p<0.04$. Similarly significant association is found between tooth sensitivity and perceived need $p<0.03$. People who had tooth sensitivity has 4 times more perceived need than people without tooth sensitivity.

Table 42 multivariate logistic regression results of key variables and physical domain of GOHAI questionnaire

Variable	B	S.E	Wald	df	Sig.	Exp (B)
Missing teeth	.401	.319	1.581	1	.209	1.494
Filling	-.377	.553	.466	1	.495	.686
Gingivitis	.143	.314	.207	1	.649	1.154
Periodontitis	1.282	.319	16.116	1	.000	3.602
Dental caries	.262	.231	1.287	1	.257	1.300
Denture present	.251	.381	.433	1	.511	1.285
Sensitivity	.026	.229	.012	1	.911	1.026
Constant	-.383	.753	.259	1	.611	.682

There were no significant association between physical domain of GOHAI questionnaire and missing teeth, filled teeth, gingivitis, dental caries, and presence of denture and teeth sensitivity. However significant association was found between periodontitis and physical domain $p<0.000$.

Table 43 multivariate logistic regression analysis showing the association between key variables and pain/discomfort domain in GOHAI questionnaire

Variable	B	S.E	Wald	df	Sig.	Exp (B)
Missing teeth	.124	.300	.172	1	.678	1.133
Filling	.445	.470	.895	1	.344	1.560
Gingivitis	.340	.307	1.225	1	.268	1.405
Periodontitis	.004	.339	.000	1	.990	1.004
Dental caries	.091	.234	.150	1	.699	1.095
Denture present	-1.014	.508	3.989	1	.046	.363
Sensitivity	.697	.233	8.943	1	.003	2.008
Constant	.782	.778	1.011	1	.315	2.187

The association between pain and discomfort domain was found only in presence of denture of denture $p<0.046$ and tooth sensitivity $p<0.003$. There was no significant association between pain and discomfort domain and missing teeth, filled teeth, gingivitis, periodontitis and dental caries.

Table 44 multivariate logistic regression results demonstrating the key variables with psychosocial domain of GOHAI questionnaire

Variable	B	S.E	Wald	df	Sig.	Exp (B)
Missing teeth	.835	.314	7.094	1	.008	2.305
Filling	-.171	.506	.114	1	.735	.843
Gingivitis	.149	.291	.261	1	.610	1.160
Periodontitis	.921	.304	9.152	1	.002	2.511
Dental caries	-.333	.220	2.293	1	.130	.717
Denture present	.596	.369	2.612	1	.106	1.815
Sensitivity	.039	.221	.031	1	.859	1.040
Constant	-.817	.714	1.310	1	.252	.442

A significant association was found between missing teeth, periodontitis and psychosocial domains of GOHAI at $p<0.008$ and $p<0.002$ respectively. However, no association was found between filled teeth, gingivitis, dental caries, and presence of denture and tooth sensitivity.

Chapter V
DISCUSSION

Chapter V

Discussion

In the discussion chapter, the findings of the study will be explained in relation to the relevant literature. Objectives will be discussed in order. Limitations of the study will be mentioned and conclusions will be drawn from the findings.

5.1 Socio demographic details

Majority of the respondents belong to the age category of 60-69 years; they comprise 76.5% of the total study population. According to the Ministry of Statistics and Programme Implementation, India has 103.9 million older people above the age of 60 in 2016, which constitute about 8.5 per cent of the population. The state of Kerala has the maximum proportion of older people (12.5%) (Elderly in India 2016). Females and males are equally distributed in the study. According to this study 92.3% of people were self-reported as married but as per the report of 2016 on older people, the number of married people is 76% which contradicts our study finding. Forty per cent of the people had reported that they had completed matriculation and a 2% had completed post-graduation. This result corresponds to the report by Ministry of Statistics and Programme Implementation. Thirty-eight per cent of the study participants had reported they are unemployed. The income was categorised according to the ration card issued by the civil supplies department. According to Economic review 2018 the percentage of people holding BPL (below poverty line) card was 36% and the AAY (Anthyodaya Anna Yojana) was 7.14%. Our sample had 52% of people below poverty line and 9.8% of people belonging to AAY category. Our results are consistent with the results of economic review 2018. (Economic Review 2018.). The study shows that 68.7% of people reported that they have systemic diseases. 66.2% of people are currently consulting a doctor for their disease and 64.9% of people are taking medicines for their systemic diseases.

5.2 Perceived oral health care needs and barriers in utilisation of dental services – questionnaire development and validation

One objective of this study was to construct and validate a questionnaire for measuring perceived oral health care needs and barriers in utilisation of dental services among older people with relevance to India. To best of our knowledge there are few studies that assessed the perceived oral health care needs and the barriers in utilisation of dental services in India.

With the epidemiological transition, the older population had increased in number at a higher rate. According to Census 2011, there are nearly 104 million older people aged 60 years or above in India. As the population increases the burden of communicable as well as non-communicable diseases in older people increases. Oral health is an integral part of general health and can influence the overall well-being of an individual (BK Sujatha et al, 2017). Most recent researchers emphasize on inequities on health of older people, health care needs, oral diseases and systemic diseases faced by older people.(Alam et al., 2016), (Panchbhai, 2012),

According to literature (Anne N Åstrøm & Irene A Kida, 2007), perceived oral health care needs are strongly associated with utilization of oral health care services. Thus, an understanding of people's need perceptions is important for effective planning and implementation of dental services. We developed and tested two questionnaires to measure perceived oral health needs and barriers in utilisation of dental services in older population. It focused on perceived oral health care needs, Last dental visit, personal barriers of older people and barriers associated with dentist and dental treatment. Most published studies were focused on children and adults. Most of the literature assessed perceived need and barriers in utilisation of dental services in limited questions and without identifying the type of need and barriers in utilisation of dental services. So, the questionnaire has 6 items for perceived oral health care needs and 17 items in barriers in utilisation of dental services.

Molete had evaluated the perceived oral health care needs by a question ‘Is there anything wrong with your teeth, gums at present?’ (Molete et al., 2014). Maharani investigated perceived need for dental care by a single question about their perceived need for dental care with a recall period of one month (Maharani, 2009). Y Pradeep et al had examined the perceived oral health care need by giving dichotomous options of yes or no (Y Pradeep,et al, 2016). Some studies had examined the specified types of perceived dental needs, Ariga and colleagues assessed the Edentulousness, Denture Wear and Denture Needs of the older people (Ariga et al., 2012) while Pillai and team assessed only prosthesis need as perceived by the participants, answered as ‘yes’ or ‘no’(Pillai et al., 2015). So, such questionnaires had only limited information of oral problems. None of these studies have evaluated the perceived need for loose tooth, bad breath, dental fracture of natural teeth and artificial teeth and tooth sensitivity which were considered in the current questionnaire.

Study done by Bommireddy et al had assessed dental visit in the past one year by doing a community based cross sectional survey (Bommireddy et al., 2014). However the study done

by Devaraj and colleagues had assessed the past dental visit on hospital outpatient basis (Devaraj and Eswar, 2012). Andréa Maria in her study had also assessed dental visits in just more than one year (Martins et al., 2008). But our study had assessed dental visit from the past five years. We had also assessed the place of visit and the reason for visiting a particular dentist.

Study done by Fozia Mir et al had assessed barriers associated with utilisation of dental services in Kashmiri population. They had only measures affordability, availability of services, fear and anxiety to dental treatment and myths and beliefs associated with oral health care (Mir et al., 2017). While Bommireddy and colleagues had assessed the patterns and barriers in utilisation of dental services by collecting information on affordability, accessibility, fear, time and importance given to dental care (Bommireddy et al., 2016). Molete had also discussed on affordability availability, accessibility and acceptability of dental treatment (Molete et al., 2014). There was no comprehensive questionnaire which assessed the personal barriers faced by the older people and also the barriers associated with dentist and dental care is also assessed in this questionnaire.

The newly developed questionnaire on perceived oral health care needs and barriers in utilisation of dental services was intended to measure the same in older population. It was developed through review of the literature and qualitative exploration of the construct of "barriers in utilisation of dental services". The study demonstrated the multidimensionality of the concept. This corresponds with the findings of previous studies (Bommireddy et al., 2016), (Zahra Yaghoubi et al 2017).

While interviewing the sample we discovered that with regard to perceived needs the information collected from the sample was consistent with the literature. But in the case of barriers, there were a lot of variations from the literature. Inherent variability was also noted. So, we developed the tool in two parts, one for perceived oral health care needs and other for barriers in utilization of dental services.

The participants' ideas of "barriers in utilisation of dental services" were closely related to the literature on barriers in utilisation of dental services and the theories on the subject (Molete et al., 2014), (Anne N Åstrøm & Irene A Kida, 2007). After conducting interview, we had categorised the barriers in utilisation of dental services as personal barriers associated with the person and barriers pertaining to dentist and dental care. The information from the depth interviews emphasise the various kinds of barriers faced by people in accessing dental care. However, due to the limitation of time, we were unable to fully explore the concept. We were

only able to touch the surface of this complex construct. Judging by the in-depth interviews, it appeared that “barriers in utilisation of dental services” is closely linked with perceived need of the people.

In this study, we identified five domains of the construct of “barriers in utilisation of dental services”: pertaining to the dental professional, pertaining to the general health of elderly, personal constraints, attitude towards dental care and fear of dental care and adaptation to dental diseases. The domains obtained are different from those identified by previous studies.

Adaptation to the condition was identified as a major domain in this questionnaire, but it was present in item 5 (“I don’t need treatment for all the dental problems because I am able to manage with other existing teeth”). In previous studies, “affordability” and “accessibility” have been found to be an important barrier in utilisation of dental services (Molete et al., 2014). However, many domains that are found in previous studies which are not relevant to this questionnaire. The newly developed questionnaire on perceived oral health care needs and barriers in utilisation of dental services is unique to a Kerala context and it differs from other scales measuring the same.

Among the items, item 3 (“diseases like diabetes, hypertension and other conditions prevent me from taking dental treatment”) received the highest individual item mean score. Item 17(“I feel it would be better if my dentist is friendly and caring”) received the lowest individual item mean score. Item 5 (“I don’t need treatment for all dental problems because I am able to manage with other existing teeth”) was a unique item in this questionnaire.it comes under the domain 3: personal constraints. This item implies the laxity of people in taking dental treatment and is considered as an important barrier in utilisation of dental services. Item 16 and 17 (“I feel it would be better if my dentist is caring and friendly” and “I feel it would be better if my dentist communicates well”) suggests a positive attitude and trust to dental care

For assuring the internal consistency of the questionnaire, Cronbach's Alpha is most widely used and Pearson’s correlation (Silverman et al., 2001), (David L. Streiner, 2010), (David L Streiner, 2003). The Cronbach’s alpha value of the newly developed questionnaire was 0.84, which shows high internal consistency. This indicates how well a number of items converge on one construct. A value above 0.70 is considered adequate (Grau, 2007). The reliability of the questionnaire was tested with Cronbach's Alpha and Pearson’s correlation which showed positive results. The reliability of the questionnaire was proven with test-retest reliability with a correlation (r) of 0.907.

Similarly, for assuring the validity of the new questionnaire, content validity (ratio and index) was assessed using Lawshe method (Keszei et al., 2010), (Rutherford-Hemming, 2015), (Lawshe, 1975) and face validity are the common psychometric characteristics (Thomas et al., 1992). Face Validity and content validity were acceptable which show good validity of the questionnaire.

Criterion validity and construct validity were not assessed in this questionnaire. This questionnaire was unique and comprehensive in assessing the oral health care needs of the older people. There was no other questionnaire with all the domains and contents of this questionnaire.

The psychometric characteristics of the questionnaire assured us that it has good capacity to measure both perceived oral health care needs and barriers in utilisation of dental services among older population. We finalized the new questionnaire by confirming its psychometric characteristics.

5.3 Perceived oral health care needs of the study population

Over 96.7% of participants felt that they needed dental treatment in the past one year. This was in contrast to the results reported by Andréa Maria and Pradeep et al, where only, 55% and 40% respectively, of the study participants reported a need for dental treatment (Y Pradeep, et al, 2016), (Martins et al., 2008) . A “no” answer for perceived oral health care needs may represent an absence of current oral health problems. However, the same “no” response can be due to many reasons. Previous studies have highlighted the differences in pain perception, with males and females while pain is being less likely to report by males. On the other hand, non-perception for dental treatment needs can be due to non -painful signs and symptoms (Y Pradeep, et al, 2016).

The percentage of people who had ever visited a dentist in their lifetime is 82.7%. In our study, perceived oral health need was found to have significantly associated to past dental visits ($p<0.01$). Seventeen percentage of the people reported that they had never visited a dentist. This results contradict with the studies done by Folasayo Adunola and Subramani and colleague were 33.8% and 44% of the participants did not have any dental visits respectively (Adunola et al., 2019), (Prabhu Subramani, Nagappan Nagappan, 2017). The dental visit among older people in the past one year was 33.4% and this results correspond to the study done by Bommireddy (Bommireddy et al., 2016) and This number was higher than the 6% reported by Kakatkar et al in 2011 (Kakatkar et al., 2011).These results shows that there are

only very less number of people taking dental services which shows that various barriers exists in utilisation of dental services.

A 51.4% of the participants who reported past dental visits sought care at a private hospital followed by government hospitals (17.7%) and least visited private dental colleges (6.2%). The reason for selecting a particular centre is due to accessibility of the centre as reported by 42.1%. Older people had 79.4% of one of their relatives to accompany them to dental clinic and 28.3% reported that spouse had accompanied them for dental treatment.

The main reason for the last dental visit was extraction of teeth 61% and 65% of participants had visited a dentist in the past one year for dental extraction. Filling the teeth (8.5%) was the next followed reason for dental visit. This results corresponds to the study done by Bommireddy e al, were 59% had undergone extraction in the past one year (Bommireddy et al., 2016). Edentulism affects the quality of life of the individuals in many ways (Sandra A Hewlett , et al, 2015). As predicted, lack of required dental care will lead to edentulism. There could be many reasons for not seeking required care, one of which could be, not realizing the requirement of care itself. Petersen and colleagues had highlighted this in their report on *improving oral health of older people,* that developing countries have a deficiency of epidemiological data regarding tooth loss in older population. They further highlighted that there exist numerous barriers for utilisation of oral health services in these countries and often pain, discomfort and non-availability of dental materials were the reasons for extraction of teeth. (Poul Erik Petersen, Tatsuo Yamamoto, 2005).

As age increases people who utilized dental services decreased. Comparing people across age group who didn't have any dental visit showed a decreasing trend. No dental visit was reported in 12.3% in 60-69 age group and 22.2% in 80-89 age group. These results show the dependency on mobility and other barriers faced by the people as they get older. These results were contradictory to the study by Thomas S whereby it was found that 51.1% to 35.5% of the older people had decreased the use of dental services as age advances (Thomas, 2011a).

"Loose tooth" (31.8%) was the most prevalent perceived oral health care need among the study population which would have been a primary motive to avail dental care by the study population; however, due to the barriers in utilisation of services, only few of the study participants with loose tooth (20%) utilized dental care in the past one year; The results are similar to the study conducted by Bommireddy et al (Bommireddy et al., 2016). The age of the participants and need for treatment for loose teeth had a significant association ($p<0.001$)

In terms of missing teeth and denture wear, 28.9% of study participants had missing teeth resulted due to extraction of carious teeth or loose teeth. The status of missing teeth and last dental visit had a significant association ($p<0.01$) and significant association was found between age and missing teeth ($p<0.05$). While 5.3% of participants perceived the need for dentures. These results did not correspond to the study done in Kerala (Albin Geo Joseph, et al, 2016)

A Considerable number of participants with decay (22.6%) and those with a pain (24%) perceived the need for treatment. But the history of dental visit in the past one year showed 16.7% of the participant had a dental visit in the past one year. The perceived dental pain and past dental visit had a significant association ($p<0.05$). These results are contradictory to the findings by Subramani et al (Prabhu Subramani, Nagappan, 2017) and corresponds to the findings by Bommireddy (Bommireddy et al., 2016). The perceived oral health care needs and dental utilisation patterns of older people show great variation and it seems the level of oral health care an individual will seek and accept will depend on the individual like age and their personal experience with dentists, past and present socio-demographic status etc (Ettinger, 1992)

Participants who were generally satisfied with their oral health, did not feel the need to utilise dental services irrespective of presence of any pathology. In terms of the general perceived need, participants in the study had a high perceived need which was significantly associated with history of dental visits. The reason for low utilisation of dental services among older people is due to individual's perspectives and prior experiences with the health care system (H.C. Gift, K.A. Atchison and T.F. Drury, 1998).

5.4 Barriers in utilisation of dental services

The questionnaire on barriers in utilisation of dental services consisted of 17 items broadly classified into 2 domains they are personal barriers of older people and barriers associated with dentist and dental treatment. The responses of the participants were captured by agree/disagree options.

Social factors influence utilisation of dental services as explained in conceptual framework. Perception and barriers in utilisation of services are subjective as the person is solo responsible for his/her dental care.

The rank order of perception regarding barriers in accessing dental services showed that 86% agree to the statement that "*I don't need dental treatment for the entire dental problem because I am able to manage with other existing teeth*" this shows the attitude of people towards dental care. There are many other factors that underlie this opinion. People tend to adapt to the settings and try to manage with other existing teeth or the other side of mouth. This shows the complacence of people towards oral health and the low priority given to oral problems as people think dental problems are not life-threatening disease.

The second most reported barrier is *dental treatment is expensive* (77.4%). This result corresponds to the study done by Poudval et al, and many other authors. It is well aware that dental care is predominantly provided by the private practicing dentist in our country and there are only a few hospitals in the public sector (Poudyal et al., 2010). The older people who has only less income are finding very difficult to afford dental care. Affordability is an important barrier in utilisation of services. Expensive nature of dental care has steadily remained a highly rated barrier to oral health care utilization worldwide particularly in developing countries with diminishing resources and lack of strong medical insurance (Ajayi and Arigbede, 2012). A significant association was found between income of the person and cost of dental treatment ($p<0.001$). These results show that dental visits are influenced by income of the person and cost of dental treatment, it was found that the higher income group found the expense of treatment less restrictive than the lower income group.

I usually take traditional remedies (salt, cloves, eucalyptus oil etc) *to relieve my tooth problems* (76.9). People find dental care to be unaffordable and tends to manage with the available home remedy. This barrier has association with affordability of services. "Lack of time" and "Inaccessibility to dental care" are considerate barriers among the study population as most of the study participants work on daily wages and unorganised sector, visit to the dentist might lose them a whole or part of their earnings for the day leading to a low dental attendance among the study population, and the results are similar to the studies conducted by Devaraj and Eswar and Jaafar et al (Jaafar et al., 1992), (Devaraj and Eswar, 2012) . Most of the studies had explained that pain was the most single concern of people. People tends to take treatment only in severe conditions like pain (S Adulyanon , J Vourapukjaru, A Sheiham, 1996), (Sheiham et al., 1982).

'I am scared of dental procedures' (52.5%) was observed as a barrier to oral health care utilization among the older population. Fear of dental injection, sound of the drill and

instruments constituted the barrier among the people. Avoiding dental care due to fear is a well-recognized phenomenon. Older people tend to avoid stressful situations and emphasis to dental literacy also plays a key role. Studies done by Kakatkar et al, Ajayi et al and Thomas S found that dental fear is related to dental attendance (Kakatkar et al., 2011), (Ajayi and Arigbede, 2012), (Thomas, 2011a).

About 71.5% of the study participant had reported that *I don't need treatment at this age* and 68.6% had reported that *dental treatment is not an emergency need*. This finding shows the inability of the older people to recognize the need for dental treatment by their own and acts as a barrier to utilization of dental services. People seek dental care only when their condition worsens. This results corresponds to the study done by Nagarjuna et al where the 50% of the study participants had reported that dental diseases are not serious (Nagarjuna, 2016).

The attitude of the dentist plays an important role in treatment outcome of the person. As a person gets older, they are physically and mentally weak. So, caring and comforting behaviour of the dentist will help the older people cope up with the stressful dental procedures. In our study 98.7% of the people wish their dentist to be caring, friendly and should communicate well. These questions are positively framed in order to gain trust and to develop a positive attitude towards dentistry among the study participants.

Non availability of all the available treatment options was reported by 67.9% of participants and confusion in choosing the right treatment option was rated by 67.3% of study participants. Several studies indicate that considerable differences exist in dentists 'decisions. One source of this variation may be professional uncertainty in diagnosing dental diseases. Literature suggests that when professional uncertainty is more, the possibility of receiving a treatment often depends on the style of practice of the dentist rather than the nature and severity of illness. When professional agreement is good, other concerns, such as systemic diseases and financial constraints of the patient will introduce some variation into prescriptions of therapy. Considering the condition of the patient alternative treatments usually considered for most of the dental problems, and these vary in effectiveness, longevity, appearance, and cost. Dentists can either prescribe the best available treatment or can deny services to those who cannot afford them, however, majority of the dentist being considerate and ethical would provide the best treatment considering the circumstances.

Patient choice often influences treatment choice, mainly because dental caries and periodontal diseases are not life threatening, and because the majority of dental treatment charges in India are still paid out-of-pocket by the patient (Grembowski, D., Milgrom, P., & Fiset, L, 1988).

Long waiting hours (79%) and multiple visits to dental clinic (65.8%) are considered as a major barrier reported by older people. Majority of the study population has been suffering from systemic diseases and there is no separate dental facility for older people. They had to share the resources with general population. Older people find it difficult to wait for dental treatment for a long time. Many had reported that they had felt this situation while availing care in public sector. Study done by Elena Borreani et al reported that fear of dental treatment and long waiting hours are associated. The anxiety or fear of treatment along with the sound of drill will gives a negative perception in older people. This anticipation is build up during the waiting hours. (Borreani et al., 2008). Mittal et al also reported that older people are aware of the long waiting hours but they continue to visit the same dentist whom they have trust. It is the responsibility of the dentist to reinforce the need for older person to have a trusting relationship. (Rakhi Mittal, 2019)

Looking into the utilisation of dental services among older people, it is noticed that as age increases the utilisation of dental services decreases from 35% to 11%. This may be due to the fact that the young old group (60-69) had more dental literacy and fewer barriers. It was also found that the very old group did not think that oral health was important. This results also shows that barriers in utilisation dental services are more as age increases. The dependency of the older people can also be considered as a major reason for non-utilisation of dental services. This result does correspond to the finding by Anne N Åstrøm, E.C.M. Lo and colleagues and Bommireddy et al that as the results in these studies also shows a decreasing trend of dental service utilisation as age increases. It is also important to identify that the study area has a very close access to oral health services provided by government, as well as private institutions but utilisation was low among them (Anne N Åstrøm & Irene A Kida, 2007), (Bommireddy et al., 2016), (Lo et al., 2016) . With increase in age the psychological decline in older people makes them extremely vulnerable to several chronic diseases. The treatment of pain and suffering caused by systemic diseases tends to be prioritized above dental care (Thomas, 2011).

There was not much difference in gender, marital status, education and work in dental service utilisation in the present study. This results corresponds to the study by Bommireddy et al in

Andra Pradesh (Bommireddy et al., 2016). People with good income utilised dental services more than people with less income. This study also has a significant association with income and to the barrier "*dental treatment is expensive*" ($p<0.001$). This results corresponds to the study by Kakatkar in Udaipur (Kakatkar et al., 2011). In India minimal amount has been allotted to social security and dental insurance for the older people, even though the dental services are very expensive. So, people avoid using dental services and symptomatically treat their dental problems with home care or over the counter medications.

5.5 Gap between perceived oral health care needs and normative oral health care needs.

The severity and increasing prevalence of dental diseases like dental caries and periodontal disease affects the quality of life and well-being of older people. To assess the oral diseases various methods have been used so far which includes self-administered questionnaires, clinical methods and screening for diseases. Treatment information can be used to evaluate outcomes of care by measuring the reduction of the need, to prioritize services according to the impact of the need, and to plan services to best meet need. (Palmqvist et al., 1991), (Shikha, 2014)

The most widely used method of need assessment in oral health is normative assessment/clinical examination which is defined by the professional. However, clinical examinations are time-consuming, expensive, requires trained examiners, and are resource demanding. But, perceptions of need for dental care play an important role as to whether people in general will seek dental care. (Gherunpong et al., 2006). The need perceived by the people will weakly correlate with professionally assessed need. Older people gives importance to symptoms and functional impacts from oral diseases when evaluating their oral health care needs for services (Gilbert et al., 1994). The gap between the perceived oral health care needs for tooth decay, gum diseases, loose teeth, sensitivity and clinically diagnosed oral diseases, which accords with previous studies (Gilbert et al., 1998), (Kåre Buhlin et al, 2002).

In this study 30 (33.3%) had wrongly perceived the need for treatment for tooth decay which was not clinically present; and 138 (44.7%) who had dental caries did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed tooth decay. This suggests that many individuals probably consider oral disease in terms of acute pain, and once the tooth is filled or extracted and the cause of discomfort or disruption in normal function is eliminated, then people won't report a need. Those without decay had a higher perception of need than those with decay. Other possible reasons for this gap may be

that the decay was asymptomatic and hence they did not feel that they needed treatment (Kiyak et al, 2005). There is also a possibility that people are unaware of the disease until diagnosed or treated, though they are aware of the presence of treatment. (Shikha, 2014)

There was a tendency to overestimate the number of teeth of decayed teeth in the study subjects. The reason why older people had a greater margin of error may have several reasons. Those who were in the older group had more decayed and missing teeth which would be difficult to distinguish from other teeth. The margin of error would have been less if people could easily identify the number of decayed teeth. Another reason is that older people have lost more teeth as a natural part of ageing and could have extracted due to dental caries or periodontitis. Some of the participants stated that they did not know about all the oral health problems that affects them. However, the question was asked about their perceived need for dental treatment and were given multiple options not as an open-ended question, the answers still had disparity. Although DMFT Index have been used intensively in clinical settings in order to assess dental caries prevalence, as well as dental treatment needs among older people. Since the proximal consequence of dental caries is pain, subjective assessment has great influence in reporting dental caries. Most of the older people will only perceive the need for treatment once they have pain. Untreated dental caries and their consequences negatively influence the quality of life among older people (Ancuta Banu, 2018).

Research worldwide indicates that periodontal diseases are widespread and it indicates that their extent and severity increase with age. The prevention and management of periodontal diseases are accomplished by maintaining proper oral hygiene.(Nagarajan and Pushpanjali, 2008). Periodontal conditions like gingival inflammation and severity of periodontitis were more difficult to self-assess. Kallio et al. suggested that self–reporting of gingival status lacks adequate validity in the screening of individuals for gingivitis (P Kallio, et al, 1994). Heloe found that gingival disease was underreported by self-assessment (HELÖE, 1972). In this study, perceived need for dental treatment was not related to clinical epidemiological oral health indicators. The presence of bleeding from gums did not relate to self-perception of periodontal health, although, in older people, bleeding from gums and loose teeth has physical, social, and psychological effects on the quality of life.

Of the people who reported gum diseases, 13 (52%) had wrongly perceived the need for treatment for gingivitis which was not clinically present; 170(45.5%) who had bleeding gums

did not perceive the need for treatment. The reason for this gap could be the method that is used for assessment, since we used the method of bleeding on probing (BOP) which means presence or absence of gingival bleeding, the gingival bleeding detected in clinical examination may not have been detected by the people. The agreement with the subjective assessment would have been better if indices like sulcus bleeding index was used which correlates severe degree of inflammation. Most of the participants were unaware of the presence of bleeding from gums. A possible reason could be the relatively asymptomatic course of the disease at least in the early stages (Nagarajan and Pushpanjali, 2008) (Yuval Vered & Harold D Sgan-Cohen, 2003). A marked disparity is found between perceived need for gum diseases and clinically assessed gingivitis. The results of this study show a disagreement with the study done by Gilbert et al (Gilbert et al., 1994). This study is in agreement with the studies of Buhlin et al people were asked about whether their gums usually bleed while brushing or in other occasions and clinically assessed by bleeding on probing (Kåre Buhlin et al, 2002). This marked difference between self-assessment and clinical assessment in gingivitis and periodontal diseases showed an urgent need for dental literacy and motivation for the maintenance of oral health. Even though both the assessment function on different dimensions of health, a minimal validity between normative oral health care need assessment and perceived oral health need assessment is expected.

The perceived need for treatment of teeth sensitivity versus clinically diagnosed wasting disease showed that Of the 54 people who reported teeth sensitivity, 24(44.4%) had wrongly perceived the need for treatment for wasting disease which was not clinically present; of 345 people who reported that they do not have sensitivity 190 (55%) were truly free of clinically diagnosed wasting diseases but 155 (44.9%) who had teeth sensitivity did not perceive the need for treatment. There was a marked disparity between the perceived need and clinically diagnosed wasting disease.

Tooth wear or tooth surface loss is a common term used to describe the surface loss of dental hard tissues which according to people is teeth sensitivity. Sensitivity to teeth can occur due to attrition and receding gums. Wear and tear of tooth surface is present in older population as natural part of aging. (Bansal et al., 2018). Many older people find it difficult to distinguish between a sensitivity caused due to attrition and a tingling sensation caused due to dental caries, this is often mistaken as teeth sensitivity. In this study 24(44.4) had wrongly perceived the need for treatment of wasting diseases. While 155(44.9) who had wasting disease on clinical

diagnosis did not perceive the need for treatment. The reason could be the adaption of the people to their current oral health condition.

There are limited studies done on teeth sensitivity and wasting diseases among elderly. So, a comparison with previous literature was not possible in this section. It is necessary to bring out more research on teeth sensitivity and wasting diseases among older people as the population ages the chances for increase in prevalence should also be considered.

5.6 Normative oral health care needs of older population using available validated tool (WHO oral health assessment form 2013)

The burden of dental caries in older population is high in India, as seen from both individual studies as well as from weighted prevalence. The prevalence varied in different parts of the country and this may be attributed to different study settings, study populations, differences in eating habits, oral hygiene habits, fluoride content in the water, etc. The DMFT index was used to assess the caries severity and distribution. The mean DMFT in this study was 8.78±8.38. The major portion, of the caries experience was missing teeth with mean score 7.39±8.55, while decay and filled teeth accounted for 1.30 ± 1.96 and 0.12±0.65, respectively. Most of the studies used DMFT index for estimating the prevalence of dental caries. There was a high score of missing teeth, as reported from most the studies, which indicates that decayed teeth or loose teeth due to periodontitis were generally extracted when in pain. The DMFT scoring do account for teeth lost for reasons other than decay (such as periodontal disease) which may be the reason for large number of missing teeth recorded and also a major limitation. The high prevalence of periodontal disease will be a reason for high prevalence of missing teeth (80.9%). The restorative procedures are rarely performed by the older people which is due to barriers like cost of treatment, multiple visits to clinic and long waiting hours (Srivastava, R., 2011). The study done by Molate on older people showed a DMFT score 17 which was contrary to our study finding. But the study has a similar finding to our study that majority of the people who had participated in the study had more missing teeth than decayed and filled teeth (Anne N Åstrøm and Irene A Kida, 2007). Various studies done in India has a contradictory result with the present study, which may be due to the regional variation. The DMFT score in a multi centric study of WHO conducted in 2007 was 5.3, which ranged from 2.4 in Rajasthan to 15.5 in Uttar Pradesh (Shah N et al, 2007) Patro et al reported a DMFT score of 13.8 (Patro BK, et al , 2008) and the nation-wide study by the DCI in 2003 reported an average DMFT score of 14.9 (Mathur D V, et al, 2004). A study from South India among older people reported a mean

DMF index of 13.5, (S. Thomas, et al, 1994) which is higher than the results reported in the present study.

The number of subjects who have or have had caries of the permanent dentition was 209 (52.4) and who had untreated caries was 198(49.6). This result shows that very few people had only undergone any form of restorative treatment. This prevalence of dental caries was much lower than the results reported by Patro et al (91.7%) and higher than that reported in Nagpur (43.2%) (Doifode et al., 2000).

The filled teeth score was the lower in this study with mean score of 0.12 ± 0.65. This study finding corresponds to the findings from the study conducted by Srivastava et al (Srivastava et al., 2012). Studies done by Goel et al and Thomas et al found no filled teeth (Thomas, 2011), (Goel p, 2006). People who need filling of teeth had either had an unmet need for treatment of dental caries or could have extracted their teeth which is much evident from the mean score of missing teeth. The mean score of missing teeth in this study accounts for 7.39±8.5. This result contradicts to the study conducted by Srivastava (Srivastava et al., 2012). In the present study, the DMFT score was significantly associated with income of the person on bivariate analysis, this shows that people with less income have more need for dental treatment as dental treatment is expensive and it is not affordable for many of them. Therefore, the only treatment option available for the majority of patients with dental caries and periodontal diseases is tooth extraction.

A significant association was found between dental caries and age. As age increases there are possibility of increase in number of carious teeth. As age increases, due to wear and tear there will be more abrasion and abfraction defects, gingival recession will be commonly seen in older people and widened contact areas between the teeth, thus increasing the risk caries. There is a tendency of high prevalence of root caries among older people in our country. In addition to that, poor oral hygiene, faulty oral hygiene practices and use of indigenous oral aids with resultant food impaction between teeth could contribute towards higher prevalence of caries in older people (Shah N, Sundaram KR., 2004)

The percentage of people with gingival bleeding was 45.6. The percentage of people with pathological periodontal pocket (≥6mm) was 91(22.9) and with pocket was (4-5mm) was 117(31). This results corresponds to the study done by Sujatha et al (BK Sujatha et al, 2017). This result contradicts with the findings of Srivastava et al (Srivastava et al., 2013). The percentage of periodontal disease can be associated with the number of missing teeth. A high

percentage of periodontal disease also contributes to a high rate for missing teeth. As age increases the prevalence of periodontal diseases increases. From the report of a multicentre study conducted in 7 distinct geographic locations of India had found a high prevalence of periodontal diseases among older age groups(Shaju et al., 2011). Epidemiological studies available at WHO confirm that periodontal disease severity and prevalence tend to be high in older age groups as compared to younger age groups (Petersen and Ogawa, 2005). Furthermore, a multi-centric study from India reported a prevalence of gingival bleeding from various parts of the country ranging from 12.3 - 99.8%. Even though the overall lower level is much lower that the results reported in our study. The results of the multi-centric study correspond to this present study. (Shaju et al., 2011), (Shah et al, 2007)

There was significant association between income and gingivitis ($p<0.05$).In most studies carried out worldwide, significant relationships between socioeconomic status and periodontal disease have been observed; i.e., people with low income contribute to poor periodontal disease status (Petersen and Baehni, 2012), (Petersen and Ogawa, 2005). According to Drury et al., the difference in prevalence and severity of periodontal disease among people of higher and lower socioeconomic status in the U.S was 10-20% (Drury et al., 1999). Considerable differences in the occurrence of periodontal disease are found by the socio environmental factors responsible for periodontal disease observed in populations living in definite geographic regions or locations (Shah et al., 2007).

The percentage of people with missing teeth was 323(80.9). This result contradicts with the study done in Nellore as the prevalence of missing teeth was 96.18% (Shabana, 2016). The reason for large number of missing teeth is that either people could have extracted teeth due to dental caries or the teeth could have worn out due to periodontal disease. A significant association was found between dental visits and missing teeth ($p<0.001$). According to the National Oral Health Survey of India 2004, tooth loss among the older people may be due to the cumulative effect of dental diseases and lack of proper oral health-care measures. This may also reflect on many things that the older people might have experienced in their past, such as high prevalence of oral diseases, unavailability of services, past socio-economic and cultural conditions, and the nature of dental care provided in earlier days. It has also been reported that age alone is not responsible for the deterioration of oral health. There may be several other factors such as multiple systemic diseases, side effects of medications, and psychological factors leading to neglect of personal and oral hygiene resulting in higher tooth loss among the older age group. (Mathur, 2004), (Shah et al., 2004), (Shabana, 2016)

The number of people with missing teeth is high in this study but the prosthetic status among the study participants is low. People with partial denture comprise of 26(6.5). This result was much lower than the results from the study done in Kochi, Kerala (Albin Geo Joseph et al.,2016). It was observed that there were large number of people who perceived that they had missing teeth but, very few had perceived the need for a denture. According to many subjects' dentures were expensive and unaffordable. Even though there is a program called "mandahasam" by the department of social justice, Kerala there are very few who avail the facility and only few are aware of such programs.

In the present study, perceived oral health care needs, on multiple regression analysis, dental caries, and gingivitis and tooth sensitivity remained statistically significant. This shows that people who had oral diseases like dental caries, gingivitis and tooth sensitivity had perceived more need for treatment than others.

5.7 Oral health related quality of life assessment using GOHAI questionnaire

The oral health related quality of life involves psychological, emotional and socioeconomic, cultural and spiritual problems. Thus, psychosocial domain shows how the person behaves in society, their concern or care of their oral health, dissatisfaction with appearance, self-awareness on oral health and avoidance of social contacts due to dental problems.

The quality of life of an older person is associated with various socio-demographic factors like education and history of dental visit. A significant association was found between psychosocial domain and education of the person ($p<0.04$). This shows that people who are more educated are more concerned about the oral health problems. This issue generates social, psychological and functional limitations, predominantly in relation to aesthetics. These people experience eating difficulties and they feel restricted in the others presence.

Furthermore, literature studies have shown that missing teeth may have a negative influence on oral health related quality of life of older people and in this study missing teeth and psychosocial domains are significantly associated ($p<0.008$). This finding was in consensus with the study carried out by Araújo Isabela Dantas Torres et al (Dantas Torres, 2015). While there was a significant association between pain domain and history of dental visit ($p<0.04$). This shows that pain the most important outcome for utilisation of dental services (Petersen et al., 2005)

A significant association was found between periodontal and psychosocial domain ($p<0.007$) With regard to opinion about dental caries, gingivitis and prostheses, psychosocial dimension results were not found to be significant. The results from this study also identify perceived oral health care needs and clinically assessed needs of these diseases, the possible reason for not reporting poor oral health in GOHAI questionnaire may be due to the negative self-evaluation when expressing a bad opinion about their oral health conditions.

Pain is one of the most common reasons for older people to seek dental care. A significant association has been found between dental caries ($p<0.01$), gingivitis ($p<0.001$) and teeth sensitivity ($p<0.001$). Pain is subjective and sensation and perception of pain will vary from person to person.(Dantas Torres, 2015), (Petersen et al., 2003.) Pain is also related to the discomfort while chewing, sensitivity in tooth and gum and finally the need for treatment to relieve pain.

The physical domain involves issues with eating, speaking, aesthetics and swallowing (Atchison and Dolan, 1990). There are many reasons for poor scores in physical domain among older people, as age increases changes in oro-facial functions like loss of muscle tone, psychomotor retardation and changes in taste perception due to multi medication therapy or oral diseases which influence the eating habit of the person. The other issues faced by the older people are loss of teeth due to dental caries or periodontal diseases and ill-fitting dentures. The missing teeth in an older person has different meaning as it promotes a feeling of shame and creates a need for replacement of teeth which is expensive for most of them and they remain edentulous for rest of life.(Shah et al., 2004), (Vd et al., 2013), (Dantas Torres, 2015)

A significant association was found between gingivitis ($p<0.006$), periodontitis ($p<0.001$), missing teeth ($p<0.001$) and prosthesis ($p<0.02$). On multivariate analysis, a significant association was found between periodontal disease and physical domain of GOHAI questionnaire. Older people with periodontal disease faces problems with chewing. It was found that people with periodontitis have substantially lower OHRQoL compared to others (Durham et al., 2013).

This research shows that there is an interrelationship between oral diseases, perceived oral health care needs and oral health related quality of life. This relationship is proved from previous research as well. The discrepancy between perceived oral health care needs and clinically assessed needs shows further research is needed in this area.

5.8 Strength of the study

The study was conducted in the southern district of Kerala, where no studies has been done on above mentioned study objectives. All findings of this study were based on the primary information collected. The use of mixed methodology helped to capture the broad range of the research problem. The findings aid in identifying the perceived oral health care needs and factors associated with barriers in utilisation of dental services among older people. We had developed a conceptual framework and developed and validated questionnaires which help to bridge the gap in literature for assessing perceived oral health care needs and barriers in utilisation of dental services in south Kerala. The questionnaire is reliable and valid in this context and population. The normative oral health assessment using WHO oral health assessment form and oral health related quality of life assessment using GOHAI questionnaire may facilitate the policy makers to prioritise their programmes towards older people and oral health care.

5.9 Limitation of the study

Despite a number of strengths, the study had certain limitations. It was a self-reported questionnaire collecting information from older people about their perception and barriers. The subjective nature of perceived oral health care need might be influenced by the individual's viewpoint on the sense of their oral health and its problems. The answers may not only influence the signs and symptoms of the dental diseases but be also influenced by social, cultural, religious factors and dental literacy. There could be of social desirability bias in responding to questions.

The questionnaire has a dichotomous question regarding perceived oral health care needs. A “no” answer may represent an absence of current oral health problems. However, the same “no” response can be attributed to many reasons. Non-perception of need may be due to

asymptomatic diseases. Majority of the study participants were from the lower socio-economic class and it has reflected on the study results.

5.8 Areas for future research

There have been very few questionnaires in the Indian context to assess the perceived oral health care needs and barriers in utilisation of dental services. Considering the literature gap, we had developed and validated a new questionnaire for measuring perceived oral health care needs and barriers in utilisation of dental services with relevance to Indian context. We had also developed a conceptual framework for this study. This questionnaire is validated in older population, it can be modified and validated in adults, and other groups also. There are few studies assessing the gap between perceived oral health care needs and normative oral health care needs. To best of our knowledge, we could not find any article related to perceived need in teeth sensitivity and clinically assessed need. Furthermore, studies can be initiated in this direction and steps to improve dental literacy can be done.

Chapter VI
SUMMARY AND CONCLUSION

Chapter VI

Summary and conclusion

The study focused on assessing perceived oral health care needs and barriers in utilisation of dental services among older people in South Kerala. We developed and validated a new questionnaire to assess perceived oral health care needs. The overall perceived oral health care needs were found to be high but, the utilization of dental services was found low in the study population. Some demographic and socioeconomic factors were associated with perceived need and barriers in utilisation of dental services.

The major findings are summarized as follows-

- The overall perceived oral health care needs are high. However, the utilisation of dental services was low because of the barriers that exist. Thirty three percent of the participants had a history of dental visit in the past one year. Sixty one percent of the people had visited a dentist to extract their teeth which according to majority of the participants as affordable. Fifty one percent of the participants had visited a private hospital for dental care. Forty two percent people had reported that accessibility as a major reason for visiting a particular hospital.
- A decreasing trend is seen in utilisation of dental services as age increases.
- The most reported barriers in utilization of dental services were adaptation to dental diseases and the cost associated with dental treatment
- A significant association was found between last dental visit and perceived oral health care needs. Significant association has also been found with income
- The mean DMFT was 8.78 (SD 8.38). The major portion, of the caries experience was missing teeth with mean 7.39± 8.55, while decay and filled teeth accounted for 1.30 ± 1.96 and 0.12±0.65, respectively.
- The clinical assessment of dental diseases showed high prevalence of missing teeth 80.9%, gum diseases 77% and dental caries 49.6%.
- Bivariate analysis showed no significant association between clinically assessed need or normative need and work, education and marital status. However, there was significant association between age and dental caries.
- There was a marked disparity between the perceived need and clinically diagnosed dental diseases. This suggests that many individuals probably consider oral disease in

terms of acute pain, and once the tooth is filled or extracted and the cause of discomfort or disruption in normal function is eliminated, then people won't report a need.

- Oral health related quality of life has a strong association with clinically assessed oral health care needs.

6.1 Implications of the finding

- We have developed a new questionnaire for measuring the perceived oral health care needs and barriers in utilisation of dental services. This questionnaire is validated in relevance to Indian settings. It is ready for use in further research
- The findings of the study communicate the situation of ~~a~~ Kollam district in South Kerala. However, these results may represent ~~all~~ other areas of the state. The findings should provide strong evidence for policy-makers to focus on the associated factors of the high prevalence of dental diseases, and low utilization of dental services.
- A discrepancy was found between clinically assessed oral health care needs and perceived oral health care needs. These results show the need for increasing dental literacy among older population.
- A reduction in oral health related quality of life was found in this population

6.2 Conclusions

In conclusion, our questionnaires do have an inherent and significant value in explaining the perceived oral health care needs and barriers in utilisation of dental services which in the present study have clearly demonstrated.

The challenge for the policy makers is to bring affordable, accessible and available dental services to the older people thus reducing the burden of disease and improving the quality of life. To minimise the barriers to utilisation of dental services and to address the health needs of the increasing older population, the health system needs to be strengthened especially the primary health care centres with need to integrate oral health program and emphasis on health promotion.

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श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
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Institutional Ethics Committee
(IEC Regn No. ECR/189/Inst/KL/2013)

SCT/IEC/1142/DECEMBER-2017 02.01.2018

Dr. Reethu S
PhD Scholar, AMCHSS
SCTIMST, Thiruvananthapuram

Dear Dr. Reethu,

The Institutional Ethics Committee reviewed and discussed your application to conduct the study entitled "PERCEIVED ORAL HEALTH CARE NEEDS AND BARRIERS IN UTILIZATION OF DENTAL SERVICES AMONG OLDER POPULATION IN SOUTH KERALA (IEC/1142)" on 16th December, 2017.

The following documents were reviewed:

Original submission

1. *Covering letter addressed to the Chairman, IEC, SCTIMST dated 14.11.2017 with check list*
2. *TAC Approval Letter 3. IEC Application Form 4. Project Proposal 5. CV of Principal Investigator and Co-PI*
6. *Consent and guidelines for in-depth interview with dental practitioners (English)*
7. *Consent and guidelines for in-depth interview with community members (English and Malayalam)*
8. *Cross sectional epidemiological survey (phase II) 9. WHO oral health assessment form*
10. *Participant Information Sheet and Consent From in English and Malayalam 11. Survey Proforma (English)*
12. *WHO oral health survey basic methods 13. Phase III-GOHAI questionnaire (English and Malayalam)*

Revised submission

1. *Covering letter addressed to the Chairman, IEC, SCTIMST dated 01.01.2018 with check list*
2. *TAC Approval Letter 3. IEC Application Form 4. Project Proposal 5. CV of Principal Investigator and Co-PI*
6. *Consent and guidelines for in-depth interview with dental practitioners (English)*
7. *Consent and guidelines for in-depth interview with community members (English and Malayalam)*
8. *Cross sectional epidemiological survey (phase II) 9. WHO oral health assessment form*
10. *Participant Information Sheet and Consent From in English and Malayalam 11. Survey Proforma (English)*
12. *WHO oral health survey basic methods 13. GOHAI questionnaire (English and Malayalam)*

The following members of the Ethics Committee were present at the meeting held on 16th December, 2017 at G. Parthasarathi Board Room, AMCHSS, SCTIMST

SL. No.	Member Name	Highest Degree	Gender	Scientific /Non Scientific	Affiliation with Institution(s)
1.	Dr. R V G Menon	M Tech, PhD	Male	Lay Person (Chairman)	No
2.	Dr. Rema M. N	MD	Female	Basic Medical Scientist	No
3.	Dr. S S Giri Sankar	LL.M. Ph.D.	Male	Legal Expert	No
4.	Dr. Aneesh V Pillai	BA. LLB (Hons.), LLM, Ph. D, SET (Law)	Male	Legal Expert	No
5	Mr. Satheesh Chandran	MSW, PGDPM	Male	Lay person/ NGO/ Social Scientist	No
6.	Smt. Sathi Nair	MA (English Literature)	Female	Lay Person	No
7.	Dr. P. Manickam	BSMS, MSc (Epid).,PhD	Male	Health Science Expert/ Social Scientist	No
8.	Dr. Christina George	MD Psychiatry	Female	Clinician	No
9.	Dr. Harikrishnan S	MD, DM (Cardiology) DNB (Cardiology)	Male	Clinician	Yes
10.	Dr. V. Raman Kutty	M D, M Phil, M P H	Male	Health Sciences Expert/Clinician	Yes
11.	Dr. Mala Ramanathan	PhD	Female	Social Scientist (Member Secretary)	Yes

IEC Decision

The IEC approved the conduct of the study in the present form.

Remarks:
The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,

Mala Ramanathan
Member Secretary, IEC

Informed Consent for In Depth Interviews with members of the community

"Perceived oral health care needs and barriers in utilisation of dental services among older population in South Kerala"

Achutha Menon Centre for Health Science Studies,

Sree Chitra Tirunal Institute for Medical Sciences & Technology,

Trivandrum, Kerala-695011

Namaskaram

I am Dr. Reethu.S, doing my Doctor of Philosophy (PhD) at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum. My doctoral research looks into the perceived oral health care needs and barriers in utilisation of dental services among older people. As part of the work, I am also attempting to develop a scale which assesses the perceived oral health care needs and barriers in utilisation of dental services. You have been approached for this interview as a member of the community. I am interested in your opinions regarding your need in dental care, your perceived oral health care needs and the barriers you face in seeking dental care. This information will guide me in the development of a scale which is intended to assess perceived oral health care needs and barriers in utilisation of dental services. Participation in this interview will take about 30-45 minutes of your time. You are free to refuse to participate in the interview at any time during the course of the interview and you are also free to refuse to answer any question at any time. You may not directly benefit from participating in this interview, but the dissemination of the results of the research study may shed more light into the problems faced by the older people in dental service utilisation and will help policy makers in better planning of oral health services in the state at large.

The information provided by you will be kept strictly confidential. Details of this interview will be transcribed and used exclusively for research. Your name, other personal details and details of your community will not be identified in the transcripts used for analysis. Records and transcripts of the interviews will be kept in safe custody by me (Principal Investigator) and will be destroyed at the end of the study.

If you agree to participate in the study, please indicate your agreement in the consent statement after reading it carefully. I would also request your permission to record this interview.

If you need any more information pertaining to any aspect of the study, please feel free to contact the following people.

You can contact me, the Principal Investigator, Dr. Reethu.S AT 9947074473 or email me at reethusalim123@gmail.com.

If you have any questions or concerns regarding this study later and would like to talk to someone other than me (the principal investigator), you may contact the Member secretary of the Institutional Ethics Committee of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum : Dr Mala Ramanathan, Phone: 0471-2524234 or email to mala@sctimst.ac.in

Thank you

Appendix II

Consent Statement

I have read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

❑ Yes, I am agreeing to the interview

Signature: _____

OR

❑ The respondent is not willing to sign (verbal consent)

Signature of the witness: _____

Name and address of the witness: _____

_____

_____

If you are not willing to participate, then thank you for your time.

Name of the respondent: _____

Address:_____

_____

_____

Interviewer's Name:

Interviewer's signature:

Respondent's Unique Identification Code: Date: Place

സമൂഹഗംങ്ങളുമായിട്ടുള്ള വിശദമായ അഭിമുഖങ്ങൾക്ക് വേണ്ടി കാര്യാബോധത്തോടെ യുള്ള സമ്മതപത്രം

"തെക്കൻ കേരളത്തിലെ ഉദേശിക്കപ്പെട്ടിട്ടുള്ള വൃദ്ധ ജനങ്ങളുടെ വായുടെ അരോഗ്യ ആവ്യശങ്ങളും ദന്ത സേവനങ്ങൾ പ്രയോജന പെടുത്തുന്നതിന്റെ തടസങ്ങളും"

അച്യുത മേനോൻ സെന്ററർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻഡ് ടെക്നോളജി

തിരുവനന്തപുരം കേരളം

നമസ്കാരം

ഡോ. റീത്തു എന്ന ഞാൻ ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസ് ആൻഡ് ടെക്നോളജി യിലെ അച്യുത മേനോൻ സെന്ററർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ് സിലെ ഗവേഷണ വിദ്യാർത്ഥി യാണ്. ഞാൻ തെക്കൻ കേരളത്തിലെ ഉദേശിക്കപ്പെട്ടിട്ടുള്ള വൃദ്ധ ജനങ്ങളുടെ വായുടെ ആരോഗ്യ ആവശ്യങ്ങളും ദന്ത സേവനങ്ങൾ പ്രയാജനപ്പെടുത്തുന്നതിലെ തടസ്സങ്ങളും എന്ന എന്റെ PhD ഗവേഷണവുമായി ബന്ധപ്പെട്ടു പഠനം നടത്തുകയാണ്. എന്റെ ഗവേഷണത്തിന്റെ ഭാഗമായി ഞാൻ വൃദ്ധ ജനങ്ങളുടെ വായിലെ ആരോഗ്യ പ്രശ്നങ്ങളെ കുറിച്ചും വൃദ്ധ ജനങ്ങളുടെ ദന്ത ആവശ്യങ്ങളെ പറ്റിയും പഠിക്കുന്നു. എന്റെ പ്രവർത്തനത്തിന്റെ ഭാഗമായി വൃദ്ധ ജനങ്ങളുടെ വായുടെ ആരോഗ്യ പ്രശനങ്ങളെ പറ്റി ഒരു അളവ് കോൽ (ചോദ്യാവലി) വികസിപ്പിക്കാൻ ശ്രമിക്കുകയാണ്. എന്റെ ചോദ്യാവലി വികസിപ്പിക്കുന്നതിന് വേണ്ടി സമൂഹത്തിലെ ഒരു അംഗം എന്ന നിലയിൽ ഞാൻ തങ്ങളെ സമീപിക്കുന്നു. തങ്ങൾ നേരിടുന്ന ദന്ത ആരോഗ്യ പ്രശനങ്ങളും സേവനങ്ങൾ എടുക്കുന്നതിന്റെ ബുദ്ധിമുട്ടുകളേയും പറ്റി അറിയുവാനും എനിക്ക് താല്പര്യം ഉണ്ട്. ഒരു അളവ് കോൽ വികസിപ്പിക്കുന്നതിന് താങ്കളുടെ അഭിപ്രായം എന്നെ സഹായിക്കും ഈ അഭിമുഖത്തിൽ പന്കെടുക്കുവാൻ താങ്കൾ 30 -40 മിനിറ്റ്ചെലവഴിക്കണം. അഭിമുഖത്തിന് ഇടയിൽ ഏത് സമയത്തും പങ്കെടുക്കുന്നതിൽ നിന്ന് താങ്കൾക്ക് പിന്മാറാനും ഏത് ചോദ്യത്തിനും ഉത്തരം പറയാതിരിക്കുവാനും താങ്കൾക്കു സ്വാതന്ത്യം ഉണ്ട്. തങ്ങൾക്കു ഈ ഗവേഷണം കൊണ്ട് പ്രയോജനം ഉണ്ടായേക്കില്ലെങ്കിലും ഗവേഷണ ഫലമായി കേരളത്തിലെ മുതിർന്ന പൗരൻമാരുടെ ദന്ത സംരക്ഷണത്തിന് സഹായകമായ രീതിയിൽ നയം രൂപീകരിക്കുന്നതിന് സഹായിക്കും. താങ്കൾ തരുന്ന വിവരങ്ങൾ തികച്ചും രഹസ്യമായി സൂക്ഷിക്കും.അഭിമുഖത്തിന്റെ രേഖപ്പെടുത്തപ്പെട്ട വിശദാംശങ്ങൾഗവേഷണ ആവശ്യങ്ങൾക്കു മാത്രമേ ഉപയോഗിക്കുകയുള്ളു. വിശകലനത്തിന് ഉപയോഗിക്കുന്ന രേഖകൾ താങ്കളുടെ വ്യക്തിപരമായ വിശദാംശങ്ങളോ സമൂഹത്തിന്റെ വിശദാംശങ്ങളോ ഉണ്ടായിരിക്കുന്നതല്ല. അഭിമുഖത്തിന്റെ വിവരങ്ങളും രേഖകളും ഞാൻ (മുഖ്യഗവേഷക) സുരക്ഷിതാമായി സൂക്ഷിക്കുകയും പഠനത്തിന് അവസാനം നശിപ്പിച്ചു കളയുകയും ചെയ്യും. ഈ അഭിമുഖം ശബ്ദലേഖനം ചെയ്യാനും താങ്കൾ സമ്മതം നൽകണമെന്ന് അഭ്യർത്ഥിക്കുന്നു.

പഠനത്തിൻറെ എതെന്ക്കിലും വശത്തെ പറ്റി കൂടുതൽ വിവരങ്ങൾ ആവശ്യമാണെങ്കിൽ തങ്ങൾക്കു താഴെ പറയുന്നവരുമായി ബന്ധപ്പെടാം .

മുഖ്യ ഗവേഷക - ഡോ റീത്തു.എസ് 9947074473 എന്ന ഫോൺ നമ്പറിലോ reethusalim123@gmail.com എന്ന ഇമെയിലിൽ ബന്ധപ്പെടാം.

താങ്കൾക്കു പിന്നീട് എതെങ്കിലും ചോദ്യങ്ങളൾ ഉണ്ടെങ്കിൽ ഞാനല്ലാതെ മറ്റാരുമായെന്ക്കിലും സംസാരിക്കണമെന്ക്കിൽ, ഇൻസ്റ്റിറ്റ്യൂട്ട് എത്തിക്സ് കമ്മിറ്റി, മെമ്പർ സെക്രട്ടറി ഡോ മാല രാമനാഥൻനെ 0471 - 2524234 എന്ന ഫോൺ നമ്പറിലോ mala@sctimst.ac.in എന്ന ഇമെയിലിൽ ബന്ധപ്പെടാം.

നന്ദി

APPENDIX III

Guidelines for in-depth interview –community members

1. Do you have any problems with your teeth or mouth?
2. When was your last dental visit?
3. If you have visited a dentist before and could you describe your experience and please high lighten the positive and / or negative aspects?
4. Could you explain any reason for not visiting the dentist? If any
5. Do you have any dental treatment needs?
6. What are the reasons for not taking dental treatment?
7. Is there anything further that you feel is important to add to this conversation?

Informed Consent for In Depth Interviews with dental practitioners

"Perceived oral health care needs and barriers in utilisation of dental services among older population in South Kerala"

Achutha Menon Centre for Health Science Studies,

Sree Chitra Tirunal Institute for Medical Sciences & Technology,

Trivandrum, Kerala-695011

Namaskaram

I am Dr. Reethu.S, doing my Doctor of Philosophy (PhD) at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum. My doctoral research looks into the perceived oral health care needs and barriers in utilisation of dental services among older people. As part of the work, I am also attempting to develop a scale which assesses the perceived oral health care needs and barriers in utilisation of dental services. You have been approached for this interview as you are a dentist and are having expertise in geriatric care and general practice. I am interested in your opinions regarding perceived oral health care needs of older people and the barriers they face in seeking dental care. This information will guide me in the development of a scale which is intended to assess perceived oral health care needs and barriers in utilisation of dental services. Participation in this interview will take about 30-45 minutes of your time. You are free to refuse to participate in the interview at any time during the course of the interview and you are also free to refuse to answer any question at any time. You may not directly benefit from participating in this interview, but the dissemination of the results of the research study may shed more light into the problems faced by the older people in dental service utilisation and will help us plan a better oral health services for older people.

The information provided by you will be kept strictly confidential. Details of this interview will be transcribed and used exclusively for research. Your name, other personal details will not be identified in the transcripts used for analysis. Records and transcripts of the interviews will be kept in safe custody by me (Principal Investigator) and will be destroyed at the end of the study.

If you agree to participate in the study, please indicate your agreement in the consent statement after reading it carefully. I would also request your permission to record this interview.

If you need any more information pertaining to any aspect of the study, please feel free to contact the following people.

You can contact me, the Principal Investigator, Dr. Reethu.S AT 9947074473 or email me at reethusalim123@gmail.com.

If you have any questions or concerns regarding this study later and would like to talk to someone other than me (the principal investigator), you may contact the Member secretary of the Institutional Ethics Committee of the Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum : Dr Mala Ramanathan, Phone: 0471-2524234 or email to mala@sctimst.ac.in

Thank you

Consent Statement

I have read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

❑ Yes, I am agreeing to the interview

Signature: _____

OR

❑ The respondent is not willing to sign (verbal consent)

Signature of the witness: _____

Name and address of the witness: _____

_____

_____

If you are not willing to participate, then thank you for your time.

Name of the respondent: _____

Address:

_____

_____

_____

Interviewer's Name:

Interviewer's signature:

Respondent's Unique Identification Code: Date: Place

APPENDIX V

Guidelines for in-depth interviews with dental practitioners

1. Do you think that older people delay dental treatment?

2. What you think are the reasons for people not visiting a dentist?

3. Do you think that the chief complaints of the people are always addressed while giving treatment?

4. Do you think the people are always satisfied with the treatment outcome?

5. If we ask dentist's about the reason for non-utilisation of dental services most of them would say lack of awareness, can you tell me any other reasons that you felt other than non-utilisation? And why?

6. Do you think perceived need for dental treatment is important for a better treatment outcome and improved quality of life?

7. Is there anything further that you feel is important to add to this conversation?

Informed Consent for cross-sectional survey

"Perceived oral health care needs and barriers in utilisation of dental services among older population in South Kerala"

Achutha Menon Centre for Health Science Studies,

Sree Chitra Tirunal Institute for Medical Sciences & Technology,

Trivandrum, Kerala-695011

Subject Information Sheet and consent form

Namaskaram

I am Dr. Reethu.S, doing my Doctor of Philosophy (PhD) at Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum. As part of my doctoral research I am conducting this survey among older people, who reside in Kollam district in South Kerala. The main purpose of this research study is to assess the perceived oral health care needs and barriers in utilisation of dental services among a randomly selected sample of older people from Kollam district, Kerala. The survey consists of two sets of questionnaires one on perceived oral health care needs and barriers in utilisation of dental services and other on oral health related quality of life (GOHAI)) which is used to assess the impact of oral diseases on quality of life. This survey is being done to assess the oral health problems and impact of oral diseases on quality of life of older people. An oral examination will be done with a dental probe aided by mouth mirror in the survey. I kindly request your participation in the survey and oral examination also. The survey which requires you to read, understand and respond to a few questions on a scale. After the survey I will examine your teeth with mouth mirror (disposable) and a probe. Gums of all teeth present in the mouth will be examined by carefully by inserting the tip of the probe between the gums and the tooth. The sensing force used will be no more than 20 g. All the teeth and the oral cavity will be examined for any oral diseases and will be informed to the participant. There will be only a mild discomfort at the time of examination. This all may take about 30-45 minutes of your valuable time.

You have been selected through an appropriate random sampling technique. There will be no direct benefits to you for participating in this survey, but the dissemination of the results of the research study may shed more light into the problems faced by the older people in dental service utilisation and will help policy makers in better planning of oral health services in the state at large. You may choose to respond to all or some of the questions in the questionnaire. The information provided by you will be kept strictly confidential. It will be maintained securely by the researcher and will not be released to anyone in a form that would allow yourself to be identified. The research findings will be reported only in an aggregate form or in a manner that will not allow individual responses to be identified. If you agree to participate in the survey, please indicate your agreement in the consent statement after reading it carefully.

If you need any more information pertaining to any aspect of the study, please feel free to contact the following people.

You can contact me, the Principal Investigator, Dr. Reethu.S, 9947074473 or email me at reethusalim123@gmail.com.

If you have any questions or concerns regarding this study later and would like to talk to someone other than me (the principal investigator), you may contact the Member secretary of the Institutional Ethics Committee of the Sree Chitra Tirunal Institute for Medical Sciences &Technology, Trivandrum : Dr Mala Ramanathan, Phone: 0471-2524234 or email to mala@sctimst.ac.in

Thank you

Consent Statement

I have read out the information in the information sheet. The nature of the study and my involvement has been explained and all my questions have been answered. By signing this consent form, I indicate that I understand what will be expected from me and that I am willing to participate in this study. I know that I can withdraw at any time. I have been informed who should be contacted if the need arises.

❑ Yes, I am agreeing to the interview

Signature: _____

OR

❑ The respondent is not willing to sign (verbal consent)

Signature of the witness: _____

Name and address of the witness: _____

_____

_____

If you are not willing to participate, then thank you for your time.

Name of the respondent: _____

Address:_____

_____

_____

Interviewer's Name:

Interviewer's signature:

Unique Identification Code: Date: Place:

സമ്മത പത്രം

“തെക്കൻ കേരളത്തിലെ ഉദേശിക്കപ്പെട്ടിട്ടുള്ള വൃദ്ധ ജനങ്ങളുടെ വായുടെ അരോഗ്യ ആവ്യശങ്ങളും ദന്ത സേവനങ്ങൾ പ്രയോജന പെടുത്തുന്നതിന്റെ തടസങ്ങളും”

അച്യുത മേനോൻ സെന്ററർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻഡ് ടെക്നോളജി

തിരുവനന്തപുരം കേരളം

നമസ്കാരം

ഡോ. റീത്തു എന്ന ഞാൻ ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസ് ആൻഡ് ടെക്നോളജി യിലെ അച്യുത മേനോൻ സെന്ററർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ് സിലെ ഗവേഷണ വിദ്യാർത്ഥി യാണ്. ഞാൻ തെക്കൻ കേരളത്തിലെ ഉദേശിക്കപ്പെട്ടിട്ടുള്ള വൃദ്ധ ജനങ്ങളുടെ വായുടെ ആരോഗ്യ ആവശ്യങ്ങളും ദന്ത സേവനങ്ങൾ പ്രയാജനപ്പെടുത്തുന്നതിലെ തടസ്സങ്ങളും എന്ന എന്റെ PhD ഗവേഷണവുമായി ബന്ധപ്പെട്ടു പഠനം നടത്തുകയാണ്. വൃദ്ധ ജനങ്ങളുടെ ദന്ത സംരക്ഷണത്തിന് ആവശ്യമായ ഗവേഷണത്തിന്റെ ഭാഗമായാണ് ഈ സർവ്വേ സംഘടിപ്പിച്ചിരിക്കുന്നത്. കൊല്ലം ജില്ലയിലെ തിരഞ്ഞെടു ക്ക പെട്ട വക്തികളിലാണ് സർവ്വേ നടത്തുന്നത്. വൃദ്ധ ജനങ്ങളുടെ ദന്ത സംരക്ഷണത്തിന് ഉപയോഗപ്രദമായ ഗവേഷണം നടത്തുക എന്നതാണ് എന്റെ പഠനത്തിൻറെ മുഖ്യ ലക്ഷ്യം. ഈ പഠനത്തിൽ പ്രധാനമായും രണ്ടു തരം ചോദ്യാവലിയാണ് ഉള്ളത്. ഒന്ന് ഉദേശിക്കപ്പെട്ടിട്ടുള്ള വൃദ്ധ ജനങ്ങളുടെ വായുടെ അരോഗ്യ ആവ്യശങ്ങളും ദന്ത സേവനങ്ങൾ പ്രയോജന പെടുത്തുന്നതിന്റെ തടസങ്ങളും മറ്റൊന്ന് ദന്ത സംരക്ഷണം ജീവിത നിലവാരവുമായി എത്രത്തോളം ബന്ധപ്പെട്ടിരിക്കു എന്നുള്ളത് ഉൾകൊള്ളുന്ന ഒരു ചോദ്യാവലിയും ആണ് (GOHAI). ഈ സർവ്വേ പ്രധാനമായും വൃദ്ധ ജനങ്ങളുടെ ദന്ത രോഗങ്ങളും അതുമായി ബന്ധപ്പെട്ട പ്രശനങ്ങളും അത് ഉണ്ടാക്കുന്ന ദോഷങ്ങളായും പറ്റിയാണ്. ഈ പഠനത്തിൽ ദന്ത പരിശോധന ഉൾപെടുതിയിതുണ്ട്. ദന്ത പരിശോധന നടത്തപ്പെടുന്നത് വായുടെ കണ്ണാടി യും (mouth mirror) മൃദു വായ ഒരു പ്രോബ് (probe) ഉപയോഗിച്ചാണ്. തങ്ങൾ ദന്ത പരിശോധനയിലും അതുമായി ബന്ധ പെട്ട പഠനത്തിലും പങ്കെടുക്കുവാൻ താഴ്മയായി അപേക്ഷിക്കുന്നു. ഈ പഠനത്തിൽ ഉൾപ്പെട്ടിട്ടുള്ള കുറച്ചു ചോദ്യങ്ങൾക്കു താങ്കൾ വായിക്കുകയും മനസിലാക്കുകയും പ്രതികരിക്കുകയും ചെയേണ്ടതാണ്. ഈ ചോദ്യാവലിക്കു ശേഷം താങ്കളുടെ വായും പല്ലും ഒറ്റ തവണ ഉപയോഗിക്കാവുന്ന ഉപകരണങ്ങൾ (വായുടെ കണ്ണാടി , മൃദുവായ പ്രോബ്) ഉപയോഗിച്ച് പരിശോധിക്കും. പ്രോബ് മോണകളുടെയും പല്ലിന്റെയും ഇടയിലൂടെ സൂക്ഷ്മമായിയാണ് പരിശോധിക്കുന്നത്. പരിശോധനക്ക് ഉപയോഗിക്കുന്ന സമ്മർദം 20 gms കൂടുകയില്ല. എല്ലാ പല്ലുകളും അവയുടെ മോണയും വായ് മൊത്തമായും പരിശോധിച്ചു രോഗവിവരം പഠനത്തിൽ പങ്കെടുക്കുന്ന വക്തിയെ അറിയിക്കുന്നതാണ്. തങ്ങളുടെ വിലയേറിയ സമയത്തിന്റെ 30 -40 മിനിറ്റ് ചെലവഴികേണ്ടിവരും. പഠനത്തിന് ഇടയിൽ ഏത് സമയത്തും പങ്കെടുക്കുന്നതിൽ നിന്ന് താങ്കൾക്ക് പിന്മാറാനും ഏത് ചോദ്യത്തിനും ഉത്തരം പറയാതിരിക്കുവാനും താങ്കൾക്കു സ്വാതന്ത്യം ഉണ്ട്. തങ്ങൾക്കു ഈ ഗവേഷണം കൊണ്ട് പ്രയോജനം ഉണ്ടായേക്കില്ലെങ്കിലും ഗവേഷണ ഫലമായി കേരളത്തിലെ മുതിർന്ന പൗരൻമാരുടെ ദന്ത സംരക്ഷണത്തിന് സഹായകമായ രീതിയിൽ നയം രൂപീകരിക്കുന്നതിന് സഹായിക്കും. താങ്കൾ തരുന്ന വിവരങ്ങൾ തികച്ചും രഹസ്യമായി സൂക്ഷിക്കും.

പഠനത്തിൽ രേഖപ്പെടുത്തപ്പെട്ട വിശദാംശങ്ങൾഗവേഷണ ആവശ്യങ്ങൾക്കു മാത്രമേ ഉപയോഗിക്കുകയുള്ളു. വിശകലനത്തിന് ഉപയോഗിക്കുന്ന രേഖകൾ താങ്കളുടെ വ്യക്തിപരമായ വിശദാംശങ്ങളോ സമൂഹത്തിന്റെ വിശദാംശങ്ങളോ ഉണ്ടായിരിക്കുന്നതല്ല. പഠനത്തിൻറെ വിവരങ്ങളും രേഖകളും ഞാൻ (മുഖ്യഗവേഷക) സുരക്ഷിതമായി സൂക്ഷിക്കുകയും പഠനത്തിന് അവസാനം നശിപ്പിച്ചു കളയുകയും ചെയ്യും.

പഠനത്തിൻറെ എതെന്ക്കിലും വശത്തെ പറ്റി കൂടുതൽ വിവരങ്ങൾ ആവശ്യമാണെങ്കിൽ തങ്ങൾക്കു താഴെ പറയുന്നവരുമായി ബന്ധപ്പെടാം .

മുഖ്യ ഗവേഷക - ഡോ റീത്തു.എസ് 9947074473 എന്ന ഫോൺ നമ്പറിലോ reethusalim123@gmail.com എന്ന ഇമെയിലിൽ ബന്ധപ്പെടാം.

താങ്കൾക്കു പിന്നീട് എതെങ്കിലും ചോദ്യങ്ങൾ ഉണ്ടെങ്കിൽ ഞാനല്ലാതെ മറ്റാരുമായെന്ക്കിലും സംസാരിക്കണമെന്ക്കിൽ, ഇൻസ്റ്റിറ്റ്യൂട്ട് എത്തിക്സ് കമ്മിറ്റി, മെമ്പർ സെക്രട്ടറി ഡോ മാല രാമനാഥൻനെ 0471 - 2524234 എന്ന ഫോൺ നമ്പറിലോ mala@sctimst.ac.in എന്ന ഇമെയിലിൽ ബന്ധപ്പെടാം.

നന്ദി

APPENDIX VII

A SURVEY TO ASSESS THE PERCEIVED ORAL HEALTH CARE NEEDS AND BARRIERS IN UTILISATION OF DENTAL SERVICES AMONG OLDER POPULATION IN SOUTH KERALA, INDIA

Part I – Survey Information

Survey ID:

Area name (rural/urban):

Consent obtained: yes/no

Date:

Time:

Name:

Contact number:

Permanent address:

Part II – Demographic information

Age:

Gender:

Marital status:

Education:

Past or present work:

Estimate of monthly income:

Part 111 – general health and medical conditions

SI NO	QUESTIONS	RESPONSE
2	Do you consult any medical doctor regularly?	❖ Yes ❖ No
3	Are you taking any medicine presently?	❖ Yes ❖ No
4	What are the diseases for which you are taking medicines?	❖ Hypertension ❖ diabetes ❖ Cardiac problems ❖ arthritis ❖ others_____

APPENDIX VIII

Perceived oral health care needs and barriers in utilisation of dental services among older people

I. **Perceived oral health care needs**

1. Did you have an oral health problem in the last year?

yes	no

If **NO** proceed to question no II

2. If YES, in the past year, which of the following oral health conditions have you had?

SINO	conditions	yes	no
1	Toothache		
2	Tooth decay		
3	Gum problems		
4	Tooth mobility		
5	Bad breath		
6	Tooth sensitivity		
7	Trauma or fracture to natural tooth		
8	Trauma or fracture to artificial tooth		
9	Oral ulcers		
10	White patches in the mouth		
11	Space due to missing teeth		
12	Uncomfortable and loose denture		
13	Others		

3. When was your last dental visit?

a. In the past one year	b. one year and upto 5 years	c. after 5 years	d. I don't remember	e. No dental visits.

If NO, proceed to question II

4. If YES, What were the reasons for your last visit to the dentist?

Routine dental check up	
To get teeth cleaned	
Filling	
Bleeding gums	
Extractions	
Dentures	
Cannot remember	
Others	

5. Where do you go for dental care?

a. Private clinics,	b. Government hospitals(district hospital, CHC)	c. government dental College,	d. Private dental college,	e. I don't remember.

6. Why did you choose a particular centre?

The cost of dental treatment was affordable to me	
The dental hospital was easy to reach	
The dentist was familiar to me	
The service provided by the dentist was good	

7. Who accompanies you to consult the dentist?

spouse	
son/daughter	
son/daughter (in-laws)	
Grand son/grand Daughter	
Home nurse/servant	
I go alone to dental hospital	
others_____	

II. BARRIERS IN UTLISATION OF DENTAL SERVICES

1. I usually take traditional remedies (salt, cloves, eucalyptus oil etc) to relieve my tooth problems.

Almost always	sometimes	seldom	never

2. When in tooth pain I take over the counter medicines (pain killers and antibiotics) and relieve pain.

Almost always	sometimes	seldom	never

3. In my opinion dental treatment is expensive.

strongly agree	agree	disagree	strongly disagree

4. I don't have enough time to take dental treatment

strongly agree	agree	disagree	strongly disagree

5. I don't need treatment for all the dental problems because I am able to manage with other existing teeth.

strongly agree	agree	disagree	strongly disagree

6. I am scared of dental procedures

strongly agree	agree	disagree	strongly disagree

7. Diseases like diabetes, hypertension, and other conditions prevent a person from taking dental treatment.

strongly agree	agree	disagree	strongly disagree

8. I have to take the advice from my doctor (cardiology, neurologist etc.) before undergoing any dental procedures.

strongly agree	agree	disagree	strongly disagree

9. I don't think I need treatment at this age

strongly agree	agree	disagree	strongly disagree

10. I think dental care is not an emergency need.

strongly agree	agree	disagree	strongly disagree

11. I have to wait long time in the hospital to get dental treatment.

strongly agree	agree	disagree	strongly disagree

12. I have to go to the dentist many times to complete my treatment.

strongly agree	agree	disagree	strongly disagree

13. I don’t fully understand what the dentist says about my treatment

strongly agree	agree	disagree	strongly disagree

14. My dentist does not give all the available treatment options.

strongly agree	agree	disagree	strongly disagree

15. I am facing confusion in selecting the best treatment choice for my condition as different dentists have been giving different opinions

strongly agree	agree	disagree	strongly disagree

16. I feel it would be better if my dentist communicate well.

strongly agree	agree	disagree	strongly disagree

17. I feel it would be better if my dentist is friendly and caring.

strongly agree	agree	disagree	strongly disagree

“തെക്കൻ കേരളത്തിലെമുതിർന്ന പൗരന്മാരുടെ ദന്ത അരോഗ്യ ആവശ്യങ്ങളെകുറിച്ചുള്ള അവരുടെ സ്വന്തം കാഴ്ച്ചപാടും ദന്ത സേവനങ്ങൾ പ്രയോജന പെടുത്തുന്നതിന്റെ തടസങ്ങളും”

1. കഴിഞ്ഞ വർഷം താങ്കൾക്ക് എതെങ്കിലും തരം ദന്ത രോഗങ്ങൾ ഉണ്ടായിരുന്നോ ?

ഉണ്ട്	ഇല്ല

ഉത്തരം **ഇല്ല** എന്നാണെങ്കിൽ II ചോദ്യാവലിയിലേക്ക് പോകുക

2. **ഉണ്ട്** എന്നാണെങ്കിൽ, ഈ കഴിഞ്ഞ വർഷം താഴെ പറയുന്നതിൽ വായുമായി ബന്ധപെട്ടു എന്ത് രോഗം ആണ് ഉണ്ടായിരുന്നത്? (ഉത്തരത്തിന് നേരെ ✓ ചെയുക)

i.	പല്ലു വേദന	
ii.	പല്ലിൽ പോട്	
iii.	മോണ രോഗങ്ങൾ	
iv.	ആടുന്ന പല്ലുകൾ	
v.	വായ് നാറ്റം	
vi.	പല്ലിന്റെ പുളിപ്പ്:	
•	ചൂട്	
•	തണുപ്പ്	
•	മധുര പദാർത്ഥങ്ങൾ	
vii.	പല്ലിന് ഉണ്ടാകുന്ന പൊട്ടൽ	
viii.	കൃത്രിമ പല്ലുകളുടെ പൊട്ടൽ	
ix.	വായിലെ വ്രണങ്ങൾ	
x.	വായുടെ വശങ്ങളിലായി കാണുന്ന വെളുത്ത പാടുകൾ	
xi.	കൃത്രിമപ്പല്ല് സംബന്ധമായ അസ്വസ്തഥകൾ	
xii.	പല്ലു നഷ്ടപെട്ടത് മൂലമുണ്ടായ വിടവ്	
xiii.	മറ്റുള്ളവ	

3. താങ്കൾ എന്നാണ് അവസാനമായി ഒരു ദന്ത ഡോക്ടറെ സന്ദർശിച്ചത് ?

i. ഒരു വർഷത്തിൽ താഴെ
ii. ഒരു വർഷം മുതൽ അഞ്ചു വർഷം വരെ
iii. അഞ്ചു വർഷത്തിന് മുകളിൽ
iv. ഞാൻ ഓർക്കുന്നില്ല
v. ഞാൻ ഒരു ദന്ത ഡോക്ടറെ കണ്ടിട്ടില്ല

ഉത്തരം iv,v എന്നാണെങ്കിൽ II ചോദ്യാവലിയിലേക്ക് പോകുക

3(a). ഉത്തരം i, ii, iii, ആണെങ്കിൽ എന്തെല്ലാം കാരണങ്ങൾ കൊണ്ടാണ് താങ്കൾ കഴിഞ്ഞ പ്രാവശ്യം ഒരു ദന്ത ഡോക്ടറെ സന്ദർശിച്ചത് ?

i. പതിവായുള്ള ദന്ത പരിശോധന
ii. പല്ലുകൾ വ്യത്തിയാക്കാൻ
iii. പല്ലിന്റെ പോടുകൾ അടയ്ക്കാൻ
iv. പല്ലു എടുക്കാൻ
v. കൃത്രിമപ്പല്ല് വയ്ക്കാൻ
vi. ഓർക്കുന്നില്ല
vii. മറ്റുള്ളവ

4. താങ്കൾ ദന്ത സേവനങ്ങൾക്ക് അവസാനമായി എവിടെ യാണ് പോയത്?

i. സ്വകാര്യ ദന്താശുപത്രിയിൽ
ii. സർക്കാർ ദന്താശുപത്രിയിൽ (ജില്ലാ ആശുപത്രി, സാമൂഹിക ആരോഗ്യ കേന്ദ്രം)
iii. സർക്കാർ ദന്തൽ കോളേജ്
iv. സ്വകാര്യ ദന്തൽ കോളേജ്
v. ഞാൻ ഓർക്കുന്നില്ല

(a) മുകളിൽ പറഞ്ഞ ആശുപത്രി ഏന്തു കൊണ്ട് താങ്കൾ തെരഞ്ഞെടുത്തു ?

i. ദന്ത പരിചരണം സാമ്പത്തികമായി താങ്ങാവുന്നതായിരുന്നു
ii. ആശുപത്രി എത്തിച്ചേരാൻ സൗകര്യ പ്രദമായിരുന്നു
iii. ദന്ത ഡോക്ടർ എനിക്ക് പരിചയമുള്ള വെക്തി ആയിരുന്നു
iv. ദന്ത ഡോക്ടറുടെ സേവനങ്ങൾ മികച്ചതായിരുന്നു
v. മറ്റുള്ളവ

5. താങ്കളുടെ കൂടെ ദന്ത ആശുപത്രിയിൽ പോകാൻ ആരാണ് അനുഗമിക്കുന്നത് ?

I. പങ്കാളി
II. മകൻ /മകൾ
III. മരുമകൻ /മരുമകൾ
IV. ചെറുമകൻ /ചെറുമകൾ
V. സഹായി
VI. ഞാൻ ഒറ്റക്കാണ് ആശുപത്രിയിൽ പോകുന്നത്
VII. മറ്റുള്ളവർ……..

6. കഴിഞ്ഞ പ്രാവശ്യം ലഭിച്ച ദന്ത പരിചരണത്തെ താങ്കൾ എങ്ങനെ വിലയിരുത്തുന്നു

i. വളരെ സംതൃപ്തികരം
ii. സംതൃപ്തികരം
iii. അഭിപ്രായമില്ല
iv. സംതൃപ്തിയില്ല
v. തീരെയും സംതൃപ്തിയില്ല

II. ദന്ത സേവനങ്ങൾ പ്രയോജനപ്പെടുത്തുന്നതിലെ തടസ്സങ്ങൾ

1. എന്റെ അഭിപ്രായത്തിൽ ദന്ത ചികിത്സ ചിലവേറിയതാണ്

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

2. എനിക്ക് ദന്ത പരിചരണത്തിന് പോകാൻ ആവശ്യമായ സമയം ഇല്ല

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

3. എന്റെ ആരോഗ്യ പ്രശനങ്ങൾ ദന്ത പരിചരണം നേടുന്നതിന് തടസമുണ്ടാക്കുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

4. എനിക്ക് എന്റെ വിദഗ്ദ്ധ ഡോക്ടറുടെ (കാർഡിയോളജിസ്റ്റ്, ന്യൂറോളജിസ്റ്റ്) ഉപദേശം ലഭിച്ചതിന് ശേഷമേ ദന്ത പരിചരണം സാധ്യമാകൂ

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

5. എനിക്ക് എല്ലാത്തരം ദന്ത രോഗങ്ങൾക്കും പരിചരണം ആവശ്യമില്ല കാരണം ആരോഗ്യമുള്ള കുറച്ചു പല്ലുകൾ കൊണ്ട് എന്റെ ആവശ്യങ്ങൾ നിറവേറാൻ സാധിക്കുന്നുണ്ട്.

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

6. എനിക്ക് ഈ പ്രായത്തിൽ ദന്ത പരിചരണം ആവശ്യമില്ല

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

7. പല്ലിന്റെ ഇപ്പോഴത്തെ പ്രശനങ്ങളുമായി ഞാൻ യോജിച്ചു പോകുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

8. ദന്ത പരിചരണം ഒരു അത്യാവശ്യ ചികിത്സയാണ് ഞാൻ കാണുന്നില്ല

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

9. എനിക്ക് വായിലെ കുത്തുവയ്പ്പു ഭയമായാണ്

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

10. ദന്ത രോഗങ്ങളിൽ നിന്നു ആശ്വാസം ലഭിക്കുന്നതിന് ഞാൻ പരമ്പരാഗതമായ ചികിത്സാ രീതികൾ (ഉപ്പു , ഗ്രാമ്പു , യൂക്കാലിപ്റ്റസ് തൈലം)സ്വീകരിക്കാറുണ്ട്

എപ്പോഴും	ചിലപ്പോഴും	അപൂർവമായി	ഒരികലുമില്ല

11. എനിക്ക് പല്ലുവേദന ഉള്ളപ്പോൾ മരുന്ന് കടയിൽ നിന്ന് മരുന്നുകൾ വാങ്ങി ഉപയോഗിക്കാറുണ്ട്

എപ്പോഴും	ചിലപ്പോഴും	അപൂർവമായി	ഒരികലുമില്ല

12. എനിക്ക് ദന്ത ചികിത്സക്കായി ആശുപത്രിയിൽ വളരെ അധികം സമയം കാത്തിരിക്കണ്ടി വരുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

13. എന്റെ ദന്ത ചികിത്സ പൂർത്തിയാകുന്നതിനു വളരെ അധികം പ്രാവശ്യം ദന്ത ഡോക്ടറുടെ അടുത്ത് പോകേണ്ടി വരുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

14. ദന്ത ഡോക്ടർ ചികിത്സയെ കുറിച്ച് പറയുന്നത് പലപ്പോഴും എനിക്ക് പൂർണമായി മനസിലാകാറില്ല

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

15. ദന്ത ഡോക്ടർ ഒരു രോഗത്തിനുള്ള ലഭ്യമായ എല്ലാ ചികിത്സ രീതികളെപ്പറ്റിയും പലപ്പോഴും പറയാറില്ല

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

16. ദന്ത ഡോക്ടർമാരുടെ ചികിത്സാരീതിയിലുള്ള വ്യത്യസ്തമായ അഭിപ്രായങ്ങൾ മൂലം ഒരു രോഗത്തിനുള്ള നല്ല ചികിത്സ തിരഞ്ഞെടുക്കുന്നതിൽ ആശയകുഴപ്പം അനുഭവിക്കാറുണ്ട്

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

17. എന്റെ ദന്ത ഡോക്ടർ നല്ല രീതിയിൽ ആശയവിനിമയം നടത്തണമെന്ന് ഞാൻ ആഗ്രഹിക്കുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

18. എന്റെ ദന്ത ഡോക്ടറിൽ നിന്ന് ഞാൻ സൗഹൃദപരമായ പെരുമാറ്റവും പരിഗണനയും ആഗ്രഹിക്കുന്നു

പൂർണമായും യോജിക്കുന്നു	യോജിക്കുന്നു	യോജിക്കുന്നില്ല	തീരെ യോജിക്കുന്നില്ല

Appendix IX

World Health Organization

Oral Health Assessment Form for Adults, 2013

Annex 1

Leave blank (1) (4) | Year Month Day (5) (10) | Identification No. (11) (14) | Orig/Dupl (15) | Examiner (16) (17)

General information: **Sex** 1=M, 2=F (18) **Date of birth** (19) (24) **Age in years** (25) (26)

(Name)

Ethnic group (27) (28) **Other group**(29) (30) **Years in school** (31) (32) **Occupation** (33)

Community (geographical location) (34) (35) **Location** Urban (1) Periurban (2) Rural (3) (36)

Other data (37) (38) **Other data** (39) (40)

Other data (41) (42) **Extra-oral examination** (43) (44)

Dentition status

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Crown (45)																	(60)
Root (61)																	(76)
Crown (77)																	(92)
Root (93)																	(108)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Permanent teeth

Status

0 = Sound
1 = Caries
2 = Filled w/caries
3 = Filled, no caries
4 = Missing due to caries
5 = Missing for any another reason
6 = Fissure sealant
7 = Fixed dental prosthesis/crown abutment, veneer, implant
8 = Unerupted
9 = Not recorded

Periodontal status (CPI Modified)

	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28	
Bleeding (109)																	(124)
Pocket (125)																	(140)
Bleeding (141)																	(156)
Pocket (157)																	(172)
	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38	

Gingival bleeding

Score

0 = Absence of condition
1 = Presence of condition
9 = Tooth excluded
X = Tooth not present

Pocket

Score

0 = Absence of condition
1 = Pocket 4–5 mm
2 = Pocket 6 mm or more
9 = Tooth excluded
X = Tooth not present

Appendix IX

World Health Organization

Oral Health Assessment Form for Adults, 2013

Loss of attachment

Index teeth

17/16 11 26/27

(173) [ ] [ ] [ ] (175)

(176) [ ] [ ] [ ] (178)

47/46 31 36/37

Severity

0 = 0–3 mm
1 = 4–5 mm Cemento-enamel junction (CEJ) within black band
2 = 6–8 mm CEJ between upper limit of black band and 8.5 mm ring
3 = 9–11 mm CEJ between 8.5 mm and 11.5 mm ring
4 = 12 mm or more CEJ beyond 11.5 mm ring
X = Excluded sextant
9 = Not recorded

* Not recorded under 15 years of age

Enamel fluorosis [ ] (179)

Severity

0 = Normal
1 = Questionable
2 = Very mild
3 = Mild
4 = Moderate
5 = Severe
8 = Excluded (crown, restoration, "bracket")
9 = Not recorded (unerupted tooth)

Dental erosion

Severity [ ] (180)

0 = No sign of erosion
1 = Enamel lesion
2 = Dentinal lesion
3 = Pulp involvement

Number of teeth affected

(181) [ ] [ ] (182)

Dental trauma

Status [ ] (183)

0 = No sign of injury
1 = Treated injury
2 = Enamel fracture only
3 = Enamel and dentine fracture
4 = Pulp involvement
5 = Missing tooth due to trauma
6 = Other damage
9 = Excluded tooth

Number of teeth affected

(184) [ ] [ ] (185)

Oral mucosal lesions

[ ] (186)
[ ] (187)
[ ] (188)

[ ] (189)
[ ] (190)
[ ] (191)

Condition

0 = No abnormal condition
1 = Malignant tumour (oral cancer)
2 = Leukoplakia
3 = Lichen planus
4 = Ulceration (aphthous, herpetic, traumatic)
5 = Acute necrotizing ulcerative gingivitis (ANUG)
6 = Candidiasis
7 = Abscess
8 = Other condition (specify if possible)
9 = Not recorded

Location

0 = Vermillion border
1 = Commissures
2 = Lips
3 = Sulci
4 = Buccal mucosa
5 = Floor of the mouth
6 = Tongue
7 = Hard and/or soft palate
8 = Alveolar ridges/gingiva
9 = Not recorded

Denture(s)

Upper [ ] (192) **Lower** [ ] (193)

Status

0 = No denture
1 = Partial denture
2 = Complete denture
9 = Not recorded

Intervention urgency [ ] (194)

0 = No treatment needed
1 = Preventive or routine treatment needed
2 = Prompt treatment (including scaling) needed
3 = Immediate (urgent) treatment needed due to pain or infection of dental and/or oral origin
4 = Referred for comprehensive evaluation or medical/dental treatment (systemic condition)

Geriatric oral health assessment index - GOHAI

Over the past 3 months,

1. How often did you limit the kind or amount of food you eat because of problems with your teeth or dentures?

Always/often	Sometimes/seldom	Never

2. How often did you have trouble biting or chewing different kinds of food, such as firm meat or apple?

Always/often	Sometimes/seldom	Never

3. How often were you able to swallow comfortably?

Always/often	Sometimes/seldom	Never

4. How often have your teeth or dentures prevented you from speaking the way you wanted?

Always/often	Sometimes/seldom	Never

5. How often were you able to eat anything without feeling discomfort?

Always/often	Sometimes/seldom	Never

6. How often did you limit contacts with people because of the condition of your teeth or dentures?

Always/often	Sometimes/seldom	Never

7. How often were you pleased or happy with the looks of your teeth and gums or dentures?

Always/often	Sometimes/seldom	Never

8. How often did you use medication to relieve pain or discomfort from around your mouth?

Always/often	Sometimes/seldom	Never

9. How often were you worried or concerned about the problems with your teeth, gums or dentures?

Always/often	Sometimes/seldom	Never

10. How often did you feel nervous or self- conscious because of the problem with your teeth, gums or dentures?

Always/often	Sometimes/seldom	Never

11. How often did you feel uncomfortable eating in front of people because of problems with your teeth or dentures?

Always/often	Sometimes/seldom	Never

12. How often were your teeth or gums sensitive to hot, cold or sweet?

Always/often	Sometimes/seldom	Never

GOHAI- Malayalam

കഴിഞ്ഞ മൂന്ന് മാസത്തിൽ:

1. പല്ലുകളിലെയോ / കൃത്രിമപ്പല്ലുകളിലെയോ പ്രശ്നങ്ങൾ കാരണം താങ്കൾ എത്ര പ്രാവിശ്യം ഭക്ഷണം കഴിക്കുന്നത് നിയന്ത്രിച്ചിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

2. കട്ടിയുള്ള ഭക്ഷണ പദാർത്ഥങ്ങൾ കടിക്കുമ്പോഴോ ചവയ്ക്കുമ്പോഴോ താങ്കൾക്ക് എത്ര പ്രാവിശ്യം പ്രയാസം അനുഭവപ്പെട്ടിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

3. താങ്കൾക്കു എത്ര പ്രാവിശ്യം ഭക്ഷണം സുഖകരമായി വിഴുങ്ങാൻ കഴിയും ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

4. ആഗ്രഹപ്രകാരം സംസാരിക്കുന്നതിൽ നിന്ന് താങ്കളുടെ പല്ലുകളോ / കൃത്രിമപല്ലുകളോ എത്ര പ്രാവിശ്യം തടസ്സമായി തോന്നിയിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

5. പ്രയാസം കൂടാതെ ഏതു തരം ഭക്ഷണം കഴിക്കുവാനും താങ്കൾക്ക് എത്ര പ്രാവിശ്യം സാധിച്ചിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

6. പല്ലുകളിലെയോ / കൃത്രിമപ്പല്ലുകളിലെയോ മോശമായ അവസ്ഥ കാരണം താങ്കൾ എത്ര പ്രാവിശ്യം മറ്റുള്ളവരിൽ നിന്നും അകലം പാലിച്ചിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

7. പല്ലുകളുടെയോ / കൃത്രിമപ്പല്ലുകളുടെയോ ,മോണകളുടെയോ നല്ലതായ അവസ്ഥ കാരണം താങ്കൾക്ക് എത്ര പ്രാവിശ്യം സംതൃപ്തി തോന്നിയിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

8. താങ്കളുടെ വായ്ക്കകത്തുള്ള വേദനയോ/അസ്വസ്ഥതയോ കാരണമായി എത്ര പ്രാവിശ്യം മരുന്നുകൾ ഉപയോഗിച്ചിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

9. പല്ലുകളുടെയോ / കൃത്രിമപ്പല്ലുകളുടെയോ ,മോണകളുടെയോ പ്രശ്നങ്ങൾ കാരണം താങ്കൾക്ക് എത്ര പ്രാവിശ്യം അസ്വസ്ഥത തോന്നിയിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

10. പല്ലുകളുടെയോ / കൃത്രിമപ്പല്ലുകളുടെയോ ,മോണകളുടെയോ പ്രശ്നങ്ങൾ കാരണം താങ്കൾക്ക് എത്ര പ്രാവിശ്യം ഭയപ്പെട്ടിട്ടുണ്ട്?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

11. പല്ലുകളുടെയോ / കൃത്രിമപ്പല്ലുകളുടെയോ, പ്രശ്നങ്ങൾ കാരണം താങ്കൾക്ക് എത്ര പ്രാവിശ്യം ആളുകളുടെ മുന്നിൽ ഭക്ഷണം കഴിക്കാൻ ബുദ്ധിമുട്ട് അനുഭവപ്പെട്ടിട്ടുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

12. ചൂട്, തണുപ്പ് മുതലായ പദാർത്ഥങ്ങൾ സ്പർശിക്കുമ്പോൾ എത്ര പ്രാവിശ്യം താങ്കളയുടെ പല്ലുകൾക്ക് തരിപ്പ് അനുഭവപെടാറുണ്ട് ?

എപ്പോഴും/മിക്കപ്പോഴും	വല്ലപ്പോഴും/ അപൂർവം	ഒരിക്കലുമില്ല

Appendix XI

Questionnaire given for content validity

Sino	Domains with items	essential	Relevant but not essential	Somewhat relevant	Can be avoided
1	**Perceptions about oral health** *"Did you think you need dental care but were unable to receive dental treatment within the past year?"*				
	In the past year, which of the following problems have you had? (Yes, No)				
2	Toothache				
3	Tooth decay				
4	Gum problems				
5	Tooth mobility				
6	Bad breath				
7	Tooth sensitivity to				
	i. heat				
	ii. cold				
	iii. sweets				
8	Trauma or fracture to natural tooth				
9	Trauma or fracture to artificial tooth				
10	Oral ulcers				
11	white patches in the mouth				
12	Space due to missing teeth				
13	uncomfortable and loose dentures				
14	Do you feel that you need to visit a dentist to seek care for any of the mentioned problems? (yes/no) If no, please mention the reason……				
	Dental visits and past dental experiences *The number of visits you made to the dentist and your dental experience*				
15	When was your last dental visit a. within one year, b. One year and up to three years, c. Three years and above, d. I don't remember, e. No dental visits.				
16	What was the reason for your visit please mention…….				
17	Where do you go for dental care? a. Private clinics, b. Government hospitals(district hospital, CHC) c. government dental College, d. Private dental college, f. I don't remember.				
18	Why did you choose the particular centre, please explain……				
19	How was your past dental experience? b. Satisfied,				

	c. Neither satisfied nor dissatisfied, d. Dissatisfied,				
20	Please state the reason for your satisfied/dissatisfied experience……..				
	<u>Barriers faced by older people in access to dental care</u> *If you had perceived a need for treatment and did not seek care during the last year, please select the most important reasons for non-utilisation of dental services.* **Please answer these questions in 3-point likert scale**				
21	*Low priority* I can manage with other teeth				
22	I don't think I need dental treatment at this age.				
23	I am adjusted to my compromised condition				
24	I don't feel the need.				
25	I give importance to my general health than dental health				
26	Dental care is not an emergency care				
27	*Affordability issues* I don't have enough money for dental treatment				
28	*Dependency issues* I don't have any one to take me to hospital.				
29	*General health* I am under medication for systemic disease				
30	I have to get the consultation of my doctor before doing any dental procedures				
31	*Time* I don't have time to go for dental treatment.				
32	I don't have time to take rest after doing dental treatment.				
33	I have difficulty in arranging an appointment with a particular dentist				
34	*Fear* I am scared of dental injections				
35	I am scared of sound of the drill				
36	I am scared of cross-infection				
37	*Home care* I use tobacco when in pain				
38	I usually take home care remedies (natural				

	methods) for tooth problems				
39	I usually take medicines given to me by my friends or relatives in case of tooth pain				
40	I usually get medicines from a medical shop in case of pain and get relieved				
	Barriers by dentist				
41	*Delay in receiving care* I have to wait a long time to get dental treatment				
42	There is a long delay in getting dental treatment in public sector				
43	I have to go to dentist many times to complete my treatment				
44	*Lack of clarity and objectivity* I don't fully understand what the dentist says				
45	Dentist does not give all treatment options				
46	Different dentist giving different treatment opinions creates confusion in decision making.				
47	*Behaviour of dentist* Dentist does not communicate well				
48	Dentist does not have a pleasing behaviour.				
49	Dentist does not show care and compassion				
50	Dentist does not try to build up a rapport				
51	Dentist does not engage in personal conversations				

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W	URL: https://www.ncbi.nlm.nih.gov/pubmed/17625014 Fetched: 6/6/2020 8:15:00 AM	2
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