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ORTHODONTIC TREATMENT NEED OF 12-YEAR-OLD SCHOOL  
CHILDREN IN DILLA TOWN, GEDEO ZONE, SOUTHERN ETHIOPIA: A  
CROSS SECTIONAL STUDY

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ORTHODONTIC TREATMENT NEED OF EARLY ADOLESCENT  
CHILDREN INDILLA TOWN, GEDEO ZONE, AND SOUTHERN ETHIOPIA:  
A CROSS SECTIONAL STUDY

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## **Abstract**

**Background:** The planning of orthodontic treatment within a public health system requires information on the orthodontic treatment needs of the population. It is important to have epidemiological data to estimate the total need for orthodontic care in any region. The present study aimed to determine the orthodontic treatment need in early adolescent children Dilla town South Ethiopian.

**Objective:** To determine the orthodontic treatment need and factors associated with DHC of IOTN of 12 year old school children among public primary school in Dilla town, South Ethiopian.

**Methods:** The institution-based cross-sectional study was conducted which include 216 early adolescent school children age of 12 randomly selected from two different public primary schools in Dilla Town, South Ethiopia. A structured questionnaire was used to interview and clinical examination used to assess the subjects. Three DMD were recruited to assess the Dental Health Component (DHC) and, Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) was assessed by the PI to estimate the treatment need.

**Statistical Analysis:** Descriptive statistics and logistic regression tests was used for data analysis with statistical significance set at  $P < 0.05$  and Adjusted odds ratio with 95% CI.

**Result:** According to the DHC of IOTN, almost half of the subjects in the sample were in moderate to the great need for orthodontic treatment. About 8.3% of the children had a great need for orthodontic treatment based on IOTN-AC. And factors associated with DHC of IOTN were sex of child, perceived AC of child and maternal education.

**Conclusion:** This study revealed that the need for orthodontic treatment was high. Therefore, publicly subsidized orthodontic treatment should be planned and provided to those who are in great need for orthodontic treatment. Besides, awareness about orthodontic treatment should also be considered.

**Key words:** orthodontic treatment need, perceived need, Dilla, Ethiopia

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## Abbreviations

<b>AC</b>	Aesthetic Component
<b>DHC</b>	Dental Health Component
<b>IOTN</b>	Index of Orthodontic Treatment Need
<b>WHO</b>	World health organization
<b>IPION</b>	Index for preventive and interceptive orthodontic treatment needs
<b>ICON</b>	Index of complexity, outcome and need
<b>TMJ</b>	Temporomandibular joint
<b>TMD</b>	Temporomandibular dysfunction
<b>ABO</b>	American Board of Orthodontics
<b>PAR</b>	peer assessment rating
<b>NHANES</b>	National Health and Nutrition Examination Survey

# 1. INTRODUCTION

## 1.1 Background

Eruption site on the arch and occlusion in permanent teeth is firmly decided by the transition of lack of compatibility of the size of teeth from primary teeth to permanent teeth through the mixed teeth duration. For this reason, early investigation of various occlusal problems in the mixed teeth that have an impact on the occurrence of malalignment of the permanent teeth is crucial. Many orthodontic records are found in the literature for the estimation of the nature of malalignments such as the Index of orthodontic treatment need (IOTN), peer assessment rating index, Index of complexity, outcome, and need (ICON), and Index for preventive and interceptive orthodontic treatment needs (IPION) (1-4). Of all these IOTN has been the most accepted index to evaluate the orthodontic treatment need. It contains two separate components: Dental Health Component (DHC) and Aesthetic Component (AC) (1).

Malocclusion is a detectable deviation from an ideal occlusion [2]. Most of these deviations are within the limit of what is to be expected as a normal biologic variation. Some malocclusions may have a negative impact on dentofacial appearance, influence to affect oral functions, susceptibility to dental traumatic injuries and tooth decay, and periodontal problems [3, 4].

Orthodontic treatments consist a large part of dental treatment and in many cases, it is done during adolescence and early adulthood to overcome malocclusion problems [3].

The planning of orthodontic treatment within a public health system needs information on the orthodontic treatment needs of the population [5, 6]. With the growing demand for orthodontic treatment, different clinician based indices have been developed to classify different types of malocclusion, and decide their orthodontic treatment need [4, 7].

## 1.2 Statement of problem

Although not enough studies were done in Ethiopia, a study conducted in the southwestern part of Ethiopia indicates the prevalence of treatment needs among 12-year-old children (15%)(8).

The research done in Nepal by the IOTN indicated that 21.59% had an Extreme treatment need, 24.67% had severe treatment need, 24.07% had moderate treatment need, 14.7% had mild treatment need, and 15.02% had no treatment need (9).

The research done in Omani indicates 13.9% had an extreme need for orthodontic treatment while 43.2% of the study subject did not need any treatment indicating that a considerable need for orthodontic intervention was present, but it was generally lower than in northern European populations. (10)

Another study was done in Saudi Arabia come up with the results of the DHC of the IOTN index showing that only 21% of all subjects (20.93% males, 21.07% females) were in severe need of treatment (IOTN grades 4 and 5), whereas 29.6% of subjects (30.32% males, 28.69% females) were in grade 3, (borderline) and 49.4% of subjects were found to be below grade 1 and 2 (48.73% males, 50.22% females) (11).

The research done in India showed that an A-Grade 1 IOTN score was seen in 48.4% of the population. Grade 2 was seen in 22.9% of the population and another study in India also showed that 52.5% of study subjects in little need, 20.5% of study subjects in moderate or borderline, 11.5% of study subjects in severe need, and 3.5% of study subjects were in the category of very severe need for treatment. On evaluating AC components, 91.6% were in the category of no or little need, 2% study subjects in moderate need, and 6.4% in the great need category (12, 13)

Despite a few studies done in Ethiopia, there is no attempt solution done to improve the treatment needs of early adolescent school children, therefore this study will be conducted to assess the treatment need of early adolescents in primary school in Dilla town, Gedeo Zone southern Ethiopia.

### **1.3 Significance of the study**

The demand for orthodontic treatment is increasing in Ethiopia quite rapidly. Many patients with malocclusion problems visit dental clinics in both government and private health facilities. However, orthodontic concern like other oral health care procedures is given low priority in the health care system because of the high cost of treatment and the shortage of orthodontists. In the light of the above reasons, since no previous studies on early adolescent has been conducted in Southern Ethiopia, it is important to have epidemiological data to estimate the total need for orthodontic care in this study area.

The objective of this study will therefore determine the need for orthodontic treatment using the Index of Orthodontic treatment needs in early adolescents in Dilla Town, Southern Ethiopia.

## 2. LITERATURE REVIEW

### 2.1 Over view of orthodontics treatment

It is difficult to define malocclusion as a single concept since it is highly variable and depends on the individual to be examined, the culture and country in which an individual belongs to, or indeed the prevailing fashion at the time. Furthermore, it is not quantified in the same way by the patient as by the professional who assesses it. Malocclusion should not be considered a disease, but an anomaly in dental development that leads to incorrect alignment and an abnormal fit between dental arches. For this reason, determining at what point this anomaly should be considered a pathology requiring treatment is a pending problem for the specialty, making it very difficult to strike a consensus (17)

Historically, orthodontic treatment was provided mainly for adolescents. Fixed appliance therapy in the United States, for example, usually was deferred until after the second molars had erupted, so that a single phase of comprehensive treatment was rendered in an efficient manner. Adult treatment was limited, and therapy initiated in the mixed dentition often consisted of guidance of eruption and serial extraction protocols, as well as extraoral traction in instances of Class II malocclusion (18).

During the last two decades, the increased need has been expressed in early treatment by a ponderable segment of the orthodontic community. This need has been stimulated by a number of seemingly diverse but interrelated factors. For example, the lay population seeks treatment for their children at an earlier age, in part due to a general rise in the level of consciousness concerning preventive dentistry and medicine. In addition, a significant segment of the dental community, including both generalists and specialists, has shown interest not only in correcting existing problems but also in intercepting or modifying abnormal orofacial conditions as they are recognized (18).

The orthodontic treatment protocols applied to growing patients generally can be divided into two categories: one-phase treatment and two-phase treatment. Both approaches have strong and vocal advocates. Nevertheless, this is not an "either/or" discussion. In our opinion, some patients benefit from a single phase of comprehensive treatment, whereas the orthodontic problems of

others are managed better if treatment is initiated in the early mixed dentition. The challenge is to select the proper treatment and the appropriate time of intervention for each patient (18).

A paradigm can be defined as “a set of shared beliefs and assumptions that represent the conceptual foundation of an area of science or clinical practice.” The soft tissue paradigm deal with both the goals and limitations of modern orthodontic treatment is decided by the soft tissues of the face, not by the dentition and bones. The first goal of treatment becomes soft tissue relationships and adaptations, not Angle’s ideal occlusion. This broader goal is not incompatible with Angle’s ideal occlusion, but it acknowledges that to deliver maximum benefit for the patient, ideal occlusion cannot always be the major focus of a treatment plan. The secondary goal of treatment becomes functional occlusion. What does that have to do with soft tissues? Temporomandibular (TM) dysfunction, to the extent that it relates to the dental occlusion, is best thought of as the result of injury to the soft tissues around the Temporomandibular joint (TMJ) caused by clenching and grinding the teeth(3).

Forwardly placed, irregular, or maloccluded teeth can cause three types of problems for the patient: (1) social discrimination because of facial appearance; (2) problems with oral function, including mastication (muscle incoordination or pain), Temporomandibular dysfunction (TMD), and problems with swallowing or speech; and (3) greatly affected by trauma, periodontal disease, or dental carry(3).

If treatment is needed, how do we decide what type of treatment to use? The present general direction in health care is toward evidence-based treatment that is, treatment procedures should be chosen on the basis of clear evidence that the selected method is the most effective approach to that particular patient’s problem(s). The better the evidence, the easier the decision and good the result(3).

Several indices for scoring how much the teeth deviate from the normal, as indicators of orthodontic treatment need, were proposed in the 1970s but not widely accepted for the screening of potential patients. There are two major ways for scoring the severity of malocclusion: the peer assessment rating (PAR) system, developed in the United Kingdom, and the American Board of Orthodontics (ABO) discrepancy index, developed in the United States.

It is necessary to remember that these systems consider just the dentition, not skeletal or facial characteristics (3).

PAR scores are calculated from measurements of maxillary and mandibular anterior alignment (crowding and spacing), buccal segment occlusion (anteroposterior, transverse, and vertical), overjet or reverse overjet, overbite, and midline discrepancies, with the use of a weighting scale for each characteristic. ABO index scores are calculated similarly; with the difference primarily that it adds three cephalometric measurements. Both systems were developed as a way to objectively determine the amount of improvement achieved during treatment but have been shown to correlate reasonably well with expert opinions of orthodontic treatment needs (3).

The Index of Treatment Need (IOTN), developed by Brook and Shaw in the United Kingdom, was planned to evaluate the need for treatment. It places patients in five grades from “no need for treatment” to “treatment required” which correlate reasonably well with the dentist’s judgments of the need for treatment. The index has a dental health component derived from occlusion and alignment and an aesthetic component developed from the comparison of the dental appearance versus standard photographs. There is an unexpectedly good correlation between treatment needs to be assessed by the dental health and aesthetic components of IOTN (i.e., children selected as needing treatment based on one of the scales are also quite likely to be selected when the other scale is used) (3).

## **2.2 Prevalence of orthodontics treatment need**

Several kinds of research have been done to evaluate the prevalence of malocclusion. It should be remembered that the figures for a specific occlusal type of dental abnormality will depend upon the size and composition of the group studied (for example age and racial characteristics), the standard used for evaluation, and the methods used by the evaluators (for example whether radiographs were employed). The results for 12-year-olds in the 2003 United Kingdom Child Dental Health Survey estimated that in the UK approximately 45% of 12-year-olds have a definite need for orthodontic treatment (19)

Now that many proportions of the population are keeping their teeth for longer, orthodontic treatment has an increasing adjunctive role prior to restorative work. In addition, there is increasing acceptability of orthodontic appliances with the effect that many adults who did not have the treatment during their early teens are now seeking orthodontic treatment (19).

With some allowances for the effect of lost teeth, it is possible to calculate the percentages of U.S. children and youths who would fall into the various IOTN grades from the NHANES III data set.<sup>30</sup> shows the percentage of youths aged 12 to 17 in the three major racial or ethnic groups in the U.S. population estimated with IOTN to have mild, moderate, or severe treatment need and the percentage who had treatment at that time. The number of white children who received orthodontic treatment was considerably increased than the number of black or Hispanic children ( $P < .001$ ) (3).

The current data imply that in typical American neighborhoods, about 35% of adolescents are perceived by parents and peers as needing orthodontic treatment. However, this is greater than the number of children who would be placed in IOTN grades 4 and 5 as having severe problems absolutely needing treatment, but lesser than the total of grades 3, 4, and 5 for moderate and severe problems(3).

Twenty-nine percent of low-income adults and 28% of young adults (18 to 34) believed the appearance of their mouth and teeth has an impact on their ability to interview for a job. This is over one-fourth of these groups. Twenty-five percent of all adults reported they avoid smiling, 23% feel embarrassed, and 20% experience anxiety because of the condition of their facial appearance and teeth. But low-income and young adults felt the greatest impact, with a minimum of 30% in each of these two groups implying that they faced a problem related to the appearance of their teeth very often or occasionally. Finally, 82% of all study subjects agreed with the statement “It is easier to get ahead in life if I have straight, bright teeth.”(3)

The research done in Greece showed that an amount of 38.7% of 12-year-olds and 33.7% of 15-year-olds were in definite need of orthodontic treatment (14). Another research done in Saudi come up with the result that about 30.9% and 17% of the adolescents were in definite need of orthodontic treatment according to DHC and AC of IOTN, respectively. There was no numerical difference in the distribution of DHC ( $p=0.116$ ) and AC ( $p=0.177$ ) scores between the gender (1)



the prevalence of moderate to severe need for orthodontic treatment in Syria was also 67.7 % (15).

The research done in southwestern Ethiopia showed that about 15% of the children had a great need for orthodontic treatment based on IOTN-AC (16).

### **3. OBJECTIVES**

#### **3.1 General objective**

To determine the orthodontic treatment need and factors associated with DHC of IOTN of 12 year old school children among primary school children, in Dilla town, South Ethiopian.

#### **3.2 Specific objective**

To assess dental DHC of IOTN of study subjects

To determine dental aesthetic self-perception of study subjects

To identify factors associated with DHC of IOTN of 12 year old school children

## **4. METHODS AND MATERIAL**

### **4.1 Study setting**

The study was conducted in Dilla town, southern Ethiopia which is located 360 Km from the capital city Addis Ababa. In the town, there are 27 primary schools, out of which 22 were private and 5 public primary schools. A total number of 12 years old school children attending public primary schools were 1432.

### **4.2 Study design**

An institution-based cross-sectional study was conducted in April 2022 among 12 years old schoolchildren in Dilla town,

### **4.3 Source and study population**

#### **4.3.1 Source population**

All 12 years old public primary school children in Dilla town

#### **4.3.2 Study populations**

All randomly selected 12 year old school children from selected public primary schools of Dilla town during the study period

### **4.4 Inclusion exclusion criteria**

#### **4.4.1 Inclusion criteria**

Those students who are 12 years old were included

#### **4.4.2 Exclusion criteria**

Those who have history of orthodontics treatment were excluded from the study

### **4.5 Sample size and sampling procedure**

To determine the required sample size for study, a single population proportion formula was used as denoted below

$$n = \frac{Z^2 p(1-p)}{d^2} = \frac{1.96^2 * 0.15(1-0.15)}{(0.05)^2} = 195$$

**With the assumptions of: 95% confidence level, margin of error (5%), and non-response (10%); n= 195 adding 10% of non-response rate = 20, final sample size n = 216**

#### **4.6 Sampling techniques**

To get the subjects, first 2 schools (30%) will be randomly selected from the available 5 public primary schools. Then, samples was proportionally allocated and computed from each selected school with their corresponding population size and from the first school 123 and 93 from the second school. Finally, sampling frames of the study subjects was obtained from the list of 12 years old school children from each selected primary school and a simple random sampling technique was used to get study subjects from each selected school.

#### **4.7 Data collection and measurement**

Data was collected using a structured interviewer administered questionnaire which was developed after reviewing different literature (S1) and clinical examination.

The data collection tool included socio-demographic characteristics, Dental Health Component of IOTN and Aesthetic Component of IOTN. A structured face-to-face interview was carried out before the respective clinical examination of each child. The children/caregiver answered questions related to socio-demographic characteristics.

Thereafter, one examiner conducted the clinical examination and rated the children AC scores. The examination was carried out in natural light using latex gloves, mouth mirror, and digital calliper. No radiographs and study casts was used. All occlusal anomalies of the DHC was recorded and scored separately in an individual form. The DHC grade was then determined according to the highest scoring anomaly. To examine the AC, a cheek retractor was applied and the appearance of the teeth was compared to the AC photographs.

The questionnaire used to collect data was prepared in English version and translated into Amharic language and back to English to check the consistency.

Training was also given to data collector to orient them by investigator on the objectives, sampling procedures, how to approach the study subjects, and the ethical conduct of the study.

## 4.8 Variable of the study

### 4.8.1 Dependent variable

Orthodontics treatment need ( DHC of IOTN)

### 4.8.2 Independent variable

Socio demographic characteristics (gender, grade, educational status, occupational status, income)

Dental health component IOTN

Aesthetic component of IOTN

## 4.9 Operational definition

**Legal guardian perceived need:** - the need for orthodontic treatment based on the aesthetic impairments depicted by aesthetic component of index of orthodontic treatment need. It represents caregiver's view on need of treatment for each grade of the aesthetic component.

**The Index of Treatment Need (IOTN):**- developed by Brook and Shaw in the United Kingdom, was designed to evaluate need for treatment. It places patients in five grades from “no need for treatment” to “treatment required” that correlate reasonably well with clinician's judgments of need for treatment. The index has a dental health component derived from occlusion and alignment

## 4.10 Data quality assurance

Prior to the actual data collection pre-test was done on 5% of the study participants in Guangua town and two days training was given data collectors and calibrated in the use of the IOTN before data collection began.

Everyday case sheets was reviewed to ensure the accuracy of each data

#### **4.11 Data collection technique**

Data was collected using a structured interviewer administered questionnaire which was developed after reviewing different literature and clinical examination. The data collection tool included socio-demographic characteristics, Dental Health Component of IOTN and Aesthetic Component of IOTN. A structured face-to-face interview was carried out before the respective clinical examination of each child. The children/caregiver answered questions related to socio-demographic characteristics. Thereafter, one examiner conducted the clinical examination and rated the children AC scores. The examination will be carried out in natural light using latex gloves, mouth mirror, and digital calliper.

#### **4.12 Data processing and analysis**

Data was cleaned, checked for missing values, entered into EpiData version 3.1, and analysed using SPSS (IBM SPSS Statistics for Macintosh, Version 26. Descriptive statistics and logistic regression was calculated for the IOTN DHC grades and IOTN AC scores. First binary logistic regression variables with  $p < 0.25$  were candidate for multiple logistic regression and  $P < 0.05$  were considered statistically significant.

#### **4.13 Ethical clearance**

Official letter was obtained from Jimma university ethical review board and permission letter from Jimma University Institutional Review Board to Dilla Town education office for permission to collect data from selected public primary school in DillaTown and selected school was contacted for consent.

Prior to data collection, the principals of schools were contacted for permission for data collection by explaining the aim of this research.

Consent from children's legal guardian and assent from the children will be obtained. Only those whose guardian's consent obtained invited to participate in study. During data collection, the study participants were informed that the information collected was kept confidential. They were also be informed verbally that they can withdraw from the study at any time. Children's requiring dental treatment for any condition diagnosed during examination was referred to Dilla University Hospital Dental Clinic for further management

Separate room from school was used for interview of children and guardian to keep subjects privacy. Questionnaire paper was kept in a safe and private (in a locker) place to keep subject's information safe.

#### **4.14 Dissemination plan**

Finally the finding was reported to the department dentistry and it was presented in research conference and also published to journals

## 5. Results

### 5.1 Socio demographic characteristics

A total of 216 12 years old school children participated in the study, giving response rate of 100%. In this study more than half of children were girl (58.8%) and none of them had history of orthodontics treatment. About half (55.6%) of the participant were attending in grade 1-4. Regarding maternal education status and occupational status; most had primary education 38.0% and 35.6% of them were housewife. House hold income level per month of the respondents had shown that, most had a monthly income of  $\geq 2000$  (Table 1)

**Table 2: Socio-demographic characteristics of orthodontics treatment need of 12 years children in Dilla town, Southern, Ethiopia, 2022**

Variables	category	Frequency	Percentage
Gender	Female	127	58.8
	Male	89	41.2
Grade	1-4	120	55.6
	5-6	96	44.4
Ethnicity	Gedeo	111	51.4
	Oromo	28	13.0
	Amhara	10	4.6
	Gurage	20	9.3
	Others	47	21.8
Religion	Protestant	129	59.7
	Orthodox	56	25.9
	Muslim	29	13.4
	Catholic	2	0.9
Maternal education	No formal education	41	19.0
	Primary school(1-8)	83	38.4
	Secondary school (9-12)	54	25.0



	College and above	38	17.0
Maternal occupation	Housewife	77	35.6
	Merchant	39	18.1
	Governmental employee	48	22.2
	Daily labour	41	19.0
	Others	11	5.1
Father education	No formal education	32	14.8
	Primary school	44	20.4
	Secondary school	59	27.3
	College and above	54	25.0
Father occupation	Merchant	25	11.6
	Farmer	13	6.0
	Governmental employee	66	30.6
	Daily labour	45	20.8
	Others	38	17.6
Monthly income	<1000	26	12.0
	1000-1999	45	20.8
	≥2000	145	67.1

## 5.2 Awareness of the children's occlusion

On the evaluation of orthodontic treatment need determined by the response of the subjects to the questionnaires, it was found that about 31.9% of the participants expressed on desire for orthodontics treatment. Around 16.2% were unsure about their orthodontics treatment need.

Regarding the children satisfaction to their dental appearance when compared to their friends nearly half (48.1%) were happy and 18.5% were unhappy. The response of the children to satisfaction with arrangement of their teeth showed that about 48.6% were happy and 20.8% of

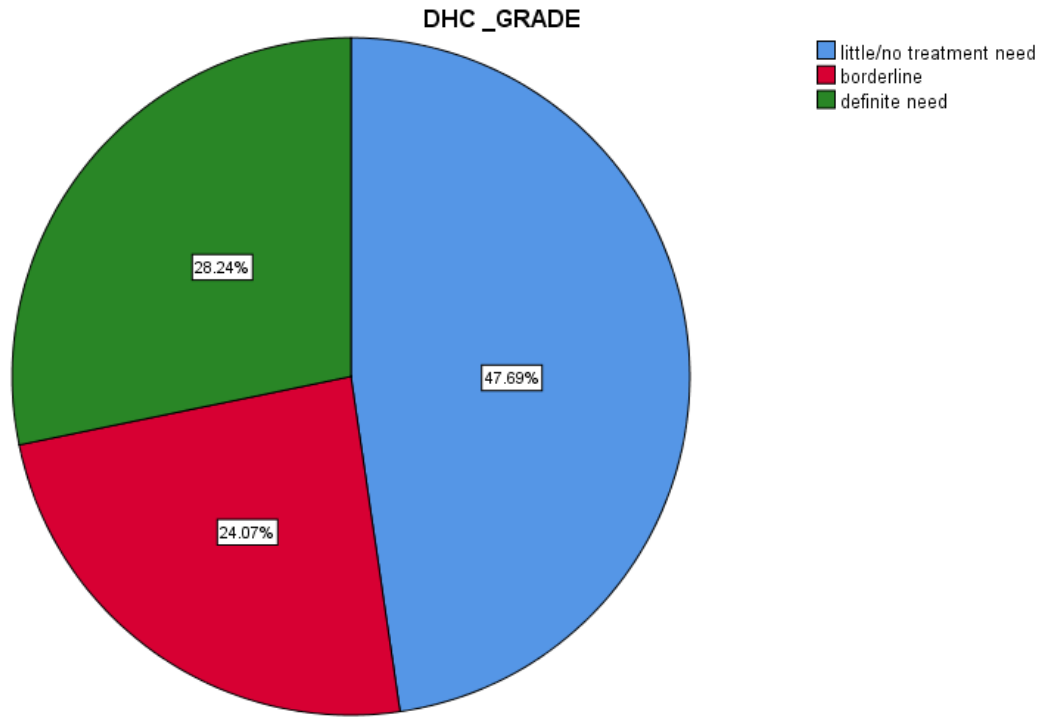
them were unhappy. Majority of (92.1%) were aware that having well aligned teeth is important for general facial appearance ( **Table 2**)

**Table 2: Awareness of the children regarding treatment need and satisfaction, Dilla town, southern, Ethiopia, 2022.**

Variables	Category	Frequency	Percentage
Demand orthodontics treatment need	Yes	69	31.9
	No	112	51.9
	I don't know	35	16.2
Satisfaction with the appearance	Very Happy	3	1.4
	Happy	104	48.1
	Normal	48	22.2
	Unhappy	40	18.5
	Very unhappy	21	9.7
Satisfaction with arrangement	Very Happy	3	1.4
	Happy	105	48.6
	Normal	49	22.2
	Unhappy	45	20.8
	Very unhappy	14	6.5
Importance of well-arranged teeth for general facial appearance	Very important	6	2.8
	Important	199	92.1
	Does not matter	4	1.9
	Not important	7	3.2

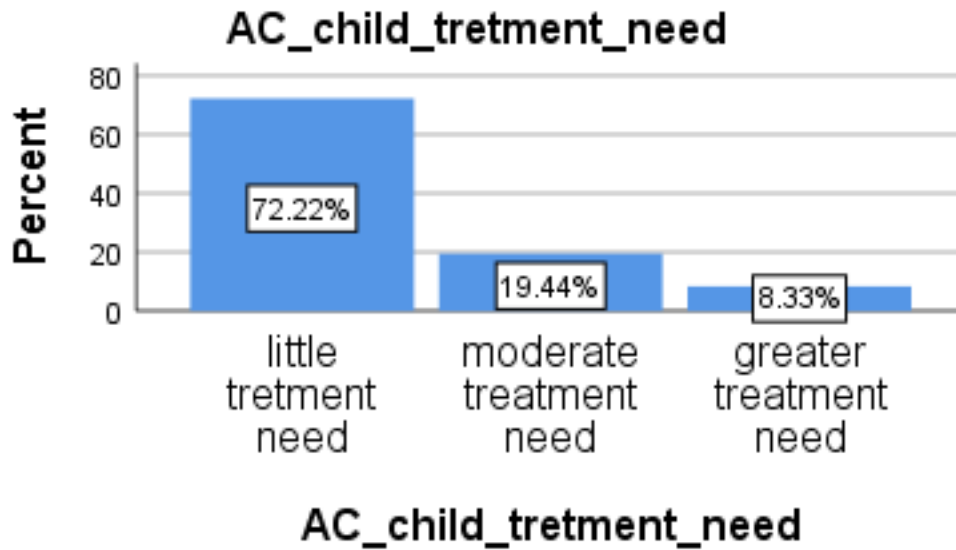
### 5.3 Orthodontics treatment need

Orthodontic treatment need by the investigator using DHC has showed that 61 (28.2%) children had definite need for orthodontics treatment, 52 (24.1%) had borderline/ moderate treatment, 103 (47.7%) had no/ little need.



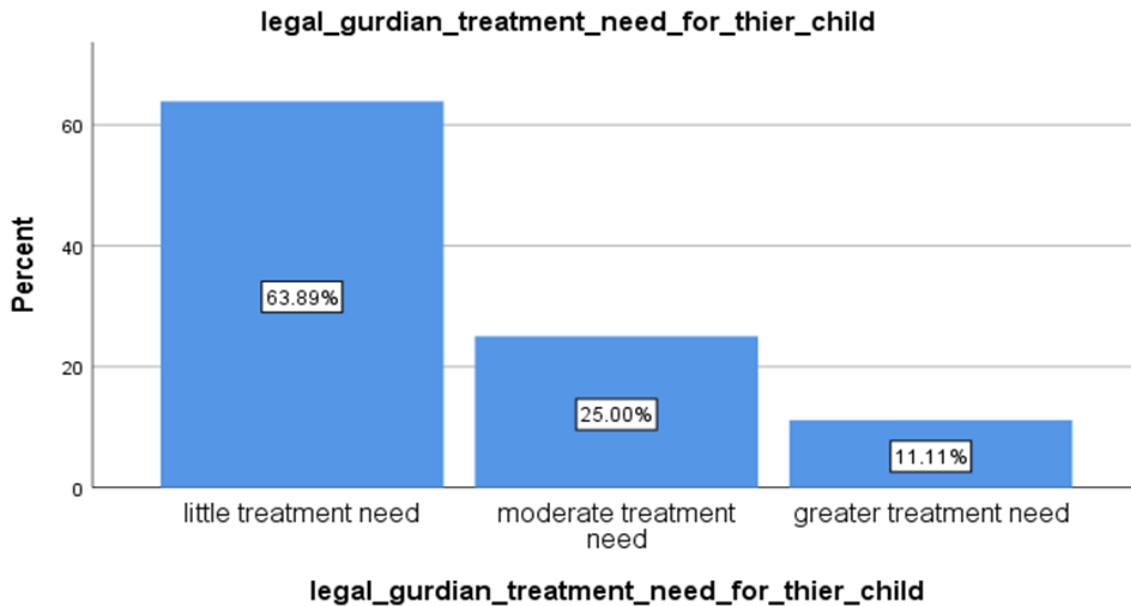
**Fig 1: orthodontics treatment need using DHC among 12 years school children Dilla town, Southern, Ethiopia, 2022**

On the evaluation of OTN determined by the investigator using AC of IOTN, it was found that 18 (8.3%) subjects had definite treatment need (AC score 8-10) and 42( 19.4 %) subject had borderline treatment need (AC score 5-7) whereas majority 156( 72.2%) subjects had no or little treatment need ( AC score 1-4).



**Fig2: AC child by investigator among 12 years old school children ,Dilla town, Southern Ethiopia, 2022**

On the other hand orthodontic treatment need determined by self-perception of the subjects with their parents using AC of IOTN, it was found that 24( 11.1%) of subjects had a definite treatment need (AC score 8-10) and 54 (25.0%) subjects had borderline treatment need (AC score 5-8), majority 138 ( 63.9%) of subjects had no or little treatment need (AC score 1-4).



**Fig3: level of legal guardian treatment need for their child among 12 years school children, Dilla town, southern Ethiopia, 2022**

## **Factors associated with perceived AC among 12years old children**

In the bivariate logistic regression analysis, grade, father's education, father occupation, orthodontics treatment need, satisfaction appearance and arrangement of their teeth, DHC of the child and legal guardian treatment need for their child were the candidate variables for multivariable analysis.

Whereas in multivariable logistic regression, fathers educational status [AOR 0.08, (95%CI (0.01, 0.44))], father occupation [AOR 0.09, (95%CI (0.01, 0.52))], orthodontic treatment need [AOR 12.5, (95%CI (2.72, 57.4))] and satisfaction on appearance of teeth [AOR 0.04, (95%CI (0.01, 0.54))] and were significantly associated with perceived AC among 12 year children,

### **Table 3.**

According to this study, the educational status of mothers had a statistically significant association with the perceived AC of children. Children born from father who have higher education were 92% more likely to have perceived AC of children than those fathers who have no formal education [AOR 0.08 (95%CI (0.01, 0.59))], children whose father have Daily labourer were 91% less likely to have perceived AC than those fathers who were governmental employee [AOR 0.09 (95%CI (0.01, 0.52))], children who are unhappy, satisfied with their appearance of teeth 83% less likely to have perceived AC than those who are happy for appearance of their teeth [AOR 0.17 (95%CI (0.08, 0.37))] and children who respond yes for orthodontic treatment need were 12 times more likely to have perceived AC than those who said no for orthodontic treatment need [AOR 12.5 (95%CI (2.72, 57.4))]

**Table 3: factors associated with perceived AC among 12 years old primary school children**

Variable	Categories	Perceived AC		COR (95%CI)	AOR(95%CI)
		Yes	no		
Father education	No formal education	6	26	1	1
	Primary school	7	37	1.22(0.36,4.05)	0.54(0.08,3.68)
	Secondary school	22	36	0.36(0.12, 1.01)	0.07(0.01, 0.44)
	College and above	17	36	0.46(0.16, 1.32)	0.08(0.01, 0.59)**
Father occupation	Governmental employee	19	47	1	1
	Daily labourer	19	26	0.55(0.25, 1.22)	0.09(0.01, 0.52)*
	Others	16	61	1.54(0.71,3.31)	0.14(0.02, 0.75)
OTN	yes	33	36	1	1
	no	13	97	5.92(2.88, 12.18)	12.5(2.72, 57.4)*
	I don't know	12	23	1.75(0.75, 4.08)	2.42(0.52, 11.1)
Satisfaction appearance of their teeth	happy	13	92	1	1
	Normal	17	30	0.19(0.08, 0.43)	0.04( 0.04, 0.48)
	Unhappy	25	34	0.17(0.08, 0.37)	0.17(0.08,0.37)

### **Factors associated with orthodontics treatment need according to DHC among 12years old children**

In the bivariate logistic regression analysis Sex, grade, orthodontic treatment need, AC perceived treatment need, and maternal education were the candidate variables for multivariable analysis.

Whereas in multivariable logistic regression, sex of child [AOR 0.27, (95%CI (0.13, 0.58))], AC of child [AOR 8.02, (95%CI (2.86, 22.40))] and maternal education [AOR 4.16, (95%CI (1.09, 15.87))] were significantly associated with DHC among 12 year children, Table 4.

According to this study female student 73% less likely to have orthodontic treatment need according to DHC than male students [AOR 0.27, (95%CI (0.13, 0.58))], children who are grade 5-8 were 82%less likely than those children who were grade 1-4 [AOR 0.82, (95%CI (0.37, 0.83))], those children with grater treatment need by perceived AC have 12 times more likely to have orthodontic treatment need according to DHC than those have little perceived need [AOR 12.1 (95% CI (2.09, 17.82))] and children born form mothers who have higher education were 4

times more likely to have orthodontic treatment need than those born from their mothers who had no formal education [AOR 4.16 (95% CI (1.09,15.87))] **table 4.**

**Table 4: factors associated with DHC among 12 years old children**

Variable	Categories	DHC		COR (95%CI)	AOR(95%CI)
		Yes	no		
Sex of child	Male	52	36	1	1
	Female	59	67	0.60(0.35,1.05)	0.27(0.13,0.58)
Grade	1-4	68	51		
	5-8	43	52	0.60(0.35,1.03)	0.82(0.37, 0.83)
AC child treatment need	Little treatment need	65	91	1	1
	Moderate treatment	34	8	5.95(2.58, 13.69)	8.02(2.86, 22.40)*
	Greater treatment	14	4	4.90(1.54,15.5)	12.1(2.09, 17.82)*
OTN	yes	44	25	1	1
	no	47	63	0.44(0.23, 0.81)	0.79(0.34, 1.84)
	I don't know	20	15	0.75(0.33, 1.73)	2.06(0.64, 6.65)
Maternal education	No formal education	24	17	1	1
	Primary	36	46	0.57(0.26, 1.21)	1.21(0.4, 3.5)*
	Secondary	23	31	0.52(0.23, 1.19)	0.53(0.17, 1.64)
	College and above	28	9	2.28(0.86, 6.03)	4.16(1.09,15.87)*

## 6. Discussion

According to this study the need for orthodontic treatment based on the DHC score showed that 113(52%) were in need for orthodontic treatment when the subjects with the moderate or greater need for treatment were summed up. A definite need for orthodontic treatment need according to DHC was observed in 28.2% of the study subjects. This finding is similar to study conducted in UK 32.7%(20) Kuwait, 28.7 (21) Italy, 27.3% (22) Peru 29.9 % (23) and South Western Ethiopia 30% (8).

However, the percentage for definite treatment need in this study is higher than the study from Tanzanian school children (24). It is also higher than the 18.1 % reported for 12 years old Sahrawi children (25), 21 % Saudi Arabian adolescents (26), 21.3% of the 9-12 year old French school children (27), 24.7% of 11-15 year old Bangladesh school children (28) and 15.3% for 12 year old Romanian school children (29).

On the other hand, study conducted in Turkey showed that 38.8% of the school children and 83.2% of the referred study subjects needed definite orthodontic treatment need (30). Other studies also reported a higher finding than from the current study (31, 32). The difference in orthodontic treatment need may be due to the different methods used, differences among the age groups and some studies included samples with story of orthodontic treatment.

Professional assessment of orthodontic treatment need according to AC of the IOTN, classified 8.3% of children as being in definite need for orthodontic treatment , this finding is comparable to a study conducted in Brazil found 8.1% of 12 year old school children had definite treatment need(33). In contrast, study conducted 12 years old western Saharan children shows that 13.7% ( 34) and among Romanian school children 11.4% (35).

The present study has also found high discrepancy in treatment needs between the DHC and AC of IOTN. The discrepancy may be attributed to the fact that malocclusion traits like missing teeth, cross bites, deep traumatic overbites, non-erupted or impacted teeth (have definite need for orthodontic treatment) have dental health implications, but do not attract a high Aesthetic Component score. In addition, as AC is subjective in its nature and assesses the aesthetic aspects of the malocclusion only in frontal view, it brings difficulties in assessing some parameters, such as degrees of overjet and Overbite (36). Hence, these indices show different aspects of



orthodontic treatment need, both of which can be used to complement each other in epidemiologic surveys and diagnostic procedures.

Father education, father occupation, orthodontic treatment need, and satisfaction on appearance of teeth were significantly associated with perceived AC among 12 years old children. On the other hand sex of child perceived AC of child and maternal education were also significantly associated with orthodontic treatment need according to DHC among 12 years old children.

The results of the present study are useful for public health planning and serve as a baseline data for future studies.

The limitations of this study were, since it is institution-based study its generalization will be limited to similar institutions only. Further, this study was performed in a specific age group, which could affect the generalizability of the findings. No other studies which were conducted previously conducted on factor associated with orthodontic treatment need. On the other hand, the possibility of interviewer bias during interviews. Besides, interexaminer reliability was not tested because we had only one examiner who carried out the clinical examination.

## **7. Conclusion**

The present study has found that a high percentage of the 12 years old school children were in need of orthodontic treatment need. Therefore, publicly subsidized orthodontic treatment should be provided to those who are in great need for orthodontic treatment. Moreover, costbenefit and cost-effectiveness analyses should be carried out to assess the acceptability of the level of service. The study may also serve as a baseline study for future studies in the study area.

## References

1. Madiraju GS, Alnabi SAA, Almarzooq AS. Orthodontic treatment need and occlusal traits in the early mixed dentition among 8-9-year old Saudi children. *Eur Oral Res* 2021; 55(3): 110-115.
2. Houston WJB, Stephens C, Tulley W. *A textbook of orthodontics*. Great Britain: Wright; 1992. p. 1–13.
3. Proffit WR, Fields HW, Sarver DM. *Contemporary Orthodontics*. 5th ed. St Louis: Mosby Elsevier; 2013. p. 15–23.
4. Shaw W, O'Brien K, and Richmond S, Brook P. Quality control in orthodontics: risk / benefit considerations. *Br Dent J*. 1991; 170(1):33–7
5. Foster T, Menezes D. The assessment of occlusal features for public health planning purposes. *Am J Orthod*. 1976;69:83–90.
6. Thilander B, Pena L, Infante C, Parada SS, de Mayorga C. Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. *Eur J Orthod*. 2001;23(2):153–67.
7. Ali Borzabadi-Farahani. An Overview of Selected Orthodontic Treatment Need Indices, Principles in Contemporary Orthodontics, Dr.SilvanoNaretto (Ed.). In *InTech*; 2011. Available from: <http://www.intechopen.com/books/principles-in-contemporary-orthodontics>
8. Tolessa et al Epidemiology of orthodontic treatment need in southwestern Ethiopian children: a cross sectional study using the index of orthodontic treatment need (2020) 20:210
9. VarunPratap Singh and Amita Sharma Epidemiology of Malocclusion and Assessment of Orthodontic Treatment Need for Nepalese Children , Volume 2014, Article ID 768357, 4 pages.
10. Al Jadidi L, Sabrish S, Shivamurthy PG, Senguttuvan V. The prevalence of malocclusion and orthodontic treatment need in Omani adolescent population. *J OrthodontSci* 2018;7:21.
11. Ravi Kumar et al The prevalence of malocclusion and the need for orthodontic treatment among adolescents in the northern border region of Saudi Arabia: an epidemiological study, 2018 18:16
12. Visnoi P, Shyagali TR, Deepak PB. Prevalence of Orthodontic Treatment Need in 7-16-Year-Old School Children of Udaipur City, India. *Turk J Orthod* 2017; 30: 73-7.
13. Shashidhar J, Chandrashekhar S. Orthodontic treatment need in higher primary schoolchildren of central Bengaluru, India. *J IntSoc Prevent Communit Dent* 2018;8:235
14. Mylonopoulou, I.-M.;Sifakakis, I.; Berdouses, E.;Kavvadia, K.; Arapostathis, K.; Oulis, C.J. Orthodontic Status andOrthodontic Treatment Need of 12- and 15-Year-

- Old Greek Adolescents: A National Pathfinder Survey. *Int. J. Environ. Res. Public Health* **2021**, *18*, 11790. <https://doi.org/10.3390/ijerph182211790>
15. Nesreen A. et al Prevalence of malocclusion and assessment of orthodontic treatment needs among Syrian refugee children and adolescents:a cross-sectional study (2021) *21:305* <https://doi.org/10.1186/s12903-021-01663-4>
  16. Tolessa et al, Epidemiology of orthodontic treatment need in southwestern Ethiopian children: across sectional study using the index of Orthodontic treatment need. (2020) *20:210* <https://doi.org/10.1186/s12903-020-011962>
  17. Bellot-Arcis, C.; Montiel-Company, J.M.; Almerich-Silla, J.M.; Paredes-Gallardo, V.; Gandia-Franco, J.L. The use of occlusal indices in high-impact literature. *Community Dent. Health* **2012**, *29*, 45–48.
  18. Orthodontics and dentofacial orthopedics/ by James A. McNamara, Jr, William L. Brudon Includes bibliographical references and index ISBN 0-9635022-3-9
  19. Laura Mitchell, introduction to orthodontics fourth edition 2013
  20. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. *Eur J Orthod.* **1989**; *11*(3):309–20.
  21. Al-azemi R, Årtun J. Orthodontic Treatment Need in Adolescent Kuwaitis :Prevalence , Severity and Manpower Requirements. *Med Princ Pract.* **2010**; *19*:348–54.
  22. Perillo L, Masucci C, Ferro F, Apicella D, Baccetti T. Prevalence of orthodontic treatment need in southern Italian school children. *Eur J Orthod.* **2010**; *32*:49–53.
  23. Bernabé E, Flores-Mir C. Normative and self-perceived orthodontic treatment need of a Peruvian university population. *Head Face Med Med.* **2006**; *2*:22.
  24. Mugonzibwa EA, Kuijpers-Jagtman AM, Van 't Hof MA, Kikwilu EN. Perception of dental attractiveness and orthodontic treatment need among Tanzanian children. *Am J Orthod Dentofac Orthop.* **2004**; *125*(4):426–34.
  25. Puertes-Fernández N, Montiel-Company JM, Almerich-Silla JM, Manzanera D. Orthodontic treatment need in a 12-year-old population in the Western Sahara. *Eur J Orthod.* **2011**; *33*(4):377–80.
  26. Puertes-Fernández N, Montiel-Company JM, Almerich-Silla JM, Manzanera D. Orthodontic treatment need in a 12-year-old population in the Western Sahara. *Eur J Orthod.* **2011**; *33*(4):377–80.
  27. Souames M, Bassigny F, Zenati N, Riordan P, Boy-Lefevre M. Orthodontic treatment need in French school children: an epidemiological study using the index of orthodontic treatment need. *Eur J Orthod.* **2006**; *28*(6):605–9.
  28. Sharmin S, Zakir H. Prevalence and factors related to malocclusion, normative and perceived orthodontic treatment need among children and adolescents in Bangladesh. *Dental Press J Orthod.* **2019**; *24*(3):44. e1–9.
  29. Corneaga A, Ioan D, Balcos C. Assessment of orthodontic treatment needs of school children from Iasi according to index of orthodontic treatment needs ( Iotn ) and dental aesthetic index ( Dai ). *Rom J Oral Rehabil.* **2011**; *3*(4):27–32.

30. Üçüncü N, Ertugay E. The use of the index of orthodontic treatment need(IOTN ) in a school population and referred population. *J Orthod.* 2001;28:45–52.
31. Hassan AH. Orthodontic treatment needs in the western region of Saudi Arabia: a research report. *Head Face Med.* 2006;2(1):2.
32. Etim SS, Aikins EA, Onyiaso CO. Normative Orthodontic Treatment Need of Nigerian Adolescents – A Comparative Study of Three Major Ethnic Groups. *J Adv in Med Medical Res.* 2020;32(3):78–87. <https://doi.org/10.9734/jammr/2020/v32i330385>.
33. Miguel JAM, Feu D, Brêtas RM, Canavaro C, Almeida MA de O. Orthodontic treatment needs of Brazilian 12-year-old school children. *World J Orthod.* 2009;10(4):305–10.
34. Puertes-Fernández N, Montiel-Company JM, Almerich-Silla JM, Manzanera D. Orthodontic treatment need in a 12-year-old population in the Western Sahara. *Eur J Orthod.* 2011;33(4):377–80.
35. Corneaga A, Ioan D, Balcos C. Assessment of orthodontic treatment need of school children from Iasi according to index of orthodontic treatment needs ( Iotn ) and dental aesthetic index ( Dai ). *Rom J Oral Rehabil.* 2011;3(4):27–32.
36. Ali Borzabadi-Farahani. An Overview of Selected Orthodontic Treatment Need Indices, Principles in Contemporary Orthodontics, Dr. Silvano Naretto (Ed.). In *InTech*; 2011. Available from: <http://www.intechopen.com/books/principles-in-contemporary-orthodontics/an-overview-of-selected-orthodontic-treatment-need-indices>.



Jimma University

Instate of health

Department of Dentistry

**Title:**Orthodontic Treatment Need of 12 year old school Children in Dilla Town, Gedeo Zone, and Southern Ethiopia: A cross sectional study

**Part I: Introduction**

Good morning/ afternoon? My name is Dr.DanyDillaWakjira, I am post graduate student in dentistry department and I am conducting a research on orthodontics treatment need among 12 years old school children in Dilla town from April 1/4/2022-15/4/2022

The purpose of conducting this study is to determine the need orthodontics treatment need in this area. This will help dental professionals to better understand what the need orthodontics treatment (straitening / moving teeth using wires) in the area and may help to motivate publicity funded treatment in the future. All information collected will be kept strictly confidential and neither you nor your child will be identifiable in any reports that are written. The decision to participate in this study is depend on you and your child willingness.

If you have any question or concern related to this study you can contact the researcher Dr.DanyDillaWakjira at the time of data collection.

If you decided to allow your child to participate in this study, please sign the consent form.

**Part II: Certificate of consent**

- Bysigningbelow, I have agreed to allow my daughter/ son to participate in this study. I have read the foregoing information and understand that the research is voluntary.

**Name of Guardian** \_\_\_\_\_

**Signature of Guardian** \_\_\_\_\_

**Date** \_\_\_\_\_

## Annex1: Tool (Questioner)

This questioner is part of a research thesis that will be conducted by Dr.DanyDillaWakjira.

All information you give is confidential

Do you want to be part of the study?

Yes

No

<b>Part 1- socio demographic characteristics of the child</b>			
Q.no	Questions	Response	Skip
101	Sex of the child	1. Male _____ 2. Female _____	
102	Student Grade	_____ Grade	
103	Religion	1. Protestant 2. Orthodox 3. Muslim 4. Catholic 5. Others ( specify)-----	
104	Ethnicity	1. Gedeo 2. Amhara 3. Oromo 4. Sidama 5. Other (specify)-----	
<b>Part two: Awareness on the children's own occlusions</b>			
105	Do you need orthodontics treatment need?	1. Yes 2. No 3. Do not known	
106	Are you happy with the arrangement of your anterior teeth?	1. Very happy 2. Happy 3. Normal 4. Un happy 5. Very unhappy	
107	Are you happy with the appearance of your own teeth compare to the teeth of your peer?	1. Very happy 2. Happy 3. Normal 4. Unhappy 5. Very unhappy	
108	Do you consider well aligned teeth important for over all facial appearance?	1. Very important 2. Important 3. Does not matter 4. Not important 5. Not important at all	



<b>Part three - perceived need</b>			
109	Look at the pictures choose what number picture do you think looks most your teeth?	1. _____	
<b>Part Four legal guardian questioners</b>			
110	Monthly income?	1. -----	
111	Maternal education	1. Can't read and write 2. Read and write only 3. Grade 1-4 4. Grade 5-8 5. Grade 9-12 6. College and above	
112	Father education	1. Can't read and write 2. Read and write only 3. Grade 1-4 4. Grade 5-8 5. Grade 9-12 6. College and above	
113	Maternal occupation	1. Merchant 2. Farmer 3. Housewife 4. Governmental employee 5. Others (specify) _____	
114	Father occupation	1. Merchant 2. Farmer 3. Daily laborer 4. Governmental employee 5. Others ( specify ) -----	
115	Look at the pictures below, choose what number picture do you think looks most your child's teeth?	1. _____	
<b>Part five: normative need based on</b>		<b>Dentalhealth component</b>	
116	CLP	5P: defect of cleft lip and palate and other craniofacial anomalies	-----
117	Missing teeth	5h:extensive hypodontia with restorative implications ( more than one teeth per guardant ) requiring pre prosthetic orthodontics	-----
		5i: impeded eruption of teeth ( except third molars, due to crowding displacement, the presence of supernumerary teeth, retained deciduous teeth, and any pathological cause	-----
		5s: Sub merged deciduous teeth	-----
		4h: less extensive hypodontia requiring pre restorative orthodontics or orthodontic space closer( one tooth per guardant	-----
118	Over jet	5a: increase over jet >9mm	-----

		4a: increase over jet >6mm but = <9mm	-----
		3a: increase over jet >3.5mm but = <6mm with incompetent lip	-----
		2a: increase over jet >3.5mm with reported masticatory	-----
119	Reverse over jet	5m: reverse over jet >3.5mm with reported masticatory and speech difficulties	-----
		4m: reverse over jet >1mm but <3.5mm with recorded masticatory and speech difficulties	-----
		4b: reverse over jet $\geq 3.5$ mm with no masticatory or speech difficulties	-----
		3b: reverse >1mm but $\leq 3.5$ mm	-----
		2b: reverse over jet >0mm but $\leq 1$ mm	-----
120	Cross bite	41: posterior lingual cross bite with no functional occlusal contact in one or both buccal segment	-----
		4c: anterior or posterior cross bite with >2mm discrepancies b/n retruded contact position and intercuspal position	-----
		3c: anterior or posterior cross bite with >1mm but $\leq 2$ mm discrepancies b/n retruded contact position and intercuspal position	-----
		2c: anterior or posterior cross bite $\leq 1$ mm discrepancy b/n retruded contact position and intercuspal position	-----
121	Displacement of contact point	4x: presence of supernumerary teeth	-----
		4t: partially erupted teeth, tipped and impacted against adjacent teeth	-----
		4d: severe contact point displacement >4mm	-----
		3d: contact point displacement >2mm by $\leq 4$ mm	-----
		2d: contact point displacement >1mm but $\leq 2$ mm	-----
		1: extremely minor malocclusion including contact point displacement <1mm	-----
122	Over bite	4e: extreme lateral or anterior open bites >4mm	-----
		3e: lateral or anterior open bite >2mm but $\leq 4$ mm	-----
		2e: anterior or posterior open bite >1mm but $\leq 2$ mm	-----
123	Deep bite	4f: anterior and complete overbite with gingival or palatal trauma	-----
		3f: deep over bite complete on gingival or palatal tissues but no trauma	-----
		2f: increase overbite $\geq 3.5$ mm without gingival contact	-----
124	Molar relationship	2g: pre normal or post normal occlusion with no other anomalies	-----

**ጅማ ዩኒቨርሲቲ**

**ጤና ኢንስቲትዩት  
የጥርስ ህክምና ትምህርት ክፍል**

**የምርምሩ / የጥናቱ ርዕስ:**

የጥርስ አብቃቀል እና አቀማመጥ ችግርን በብረስ ህክምና የማስተካከል ፍላጎት ዲላ በሚገኙ 12 ዓመት የሆናቸው ህፃናት ላይ

**ክፍል አንድ: የፍቃደኝነት መጠየቂያ ቅፅ**

እንደምን ዋሉ ስሜ ዶ/ር ዳኒዲላ ዋቅጅራ ይባላል። በጅማ ዩኒቨርሲቲ የጥርስ ህክምና ትምህርት ክፍል የድህረ ምረቃ ተማሪ ስሆን በዲላ ከተማ የመንግስት ትምህርት ቤቶች ውስጥ በሚገኙ እድሜቸው 12 ዓመት የሆኑ ህፃናት የብረስ ህክምና ፍላጎት ላይ ከ 1/8/14-15/8/14 ድረስ ጥናት አደርጋለሁ።

ይህም ለጥርስ ህክምና ባለሙያዎች በህፃናት ላይ ያለውን የብረስ ህክምና ፍላጎት መጠን እንዲያውቁ ይረዳል። በተጨማሪም በመንግስት ወይም መንግስታዊ ባልሆኑ ድርጅቶች ድጋፍ የብረስ ህክምናን ለህብረተሰቡ ለመስጠት ይረዳል።

ጥናቱ የሚጋብዘው 12 ዓመት የሆናቸውን ህፃናት እና ቤተሰቦቻቸውን ነው። የእርሶ ልጅ በዚህ ቃለመጠይቅ የተጋበዘው በእጣ ነው። በጥናቱ ወቅት የተፈለገውን መረጃ ከመውሰድ ውጭ የእርሶ ልጅ ላይ የሚደርስ ምንም አይነት ጉዳት የለም። ከዚህም ሌላ ላረጋግጥልዎት የምፈልገው እርሶም ልጅም የሚሰጡት መረጃ ሚስጥራዊነቱ የተጠበቀና ለዚህ ጥናት አላማ ብቻ የሚውል ነው። የእርሶ ልጅ በጥናቱ የመሳተፍ እና ያለመሳተፍ መብት በእርሶና በልጅት ይወሰናል። ጥናቱን በተመለከተ ጥያቄ ካለዎት ወይም ያልተረዱት ነገር ካለ የጥናቱን ባለሙያ ዶ/ር ዳኒዲላ ዋቅጅራን ማናገር ይችላሉ።

የእርሶ ልጅ በዚህ ጥናት እንዲሳተፍ ከፈቀዱ ከዚህ ቅፅ ጋር የተያያዘውን የስምምነት ፎርም እና መጠይቅ እንዲሞሉ በአክብሮት እጠይቃለሁ።

**ክፍልሁለት: የስምምነት ማስፈረሚያ ቅፅ**

ከላይ ያለውን መረጃ አንብቦና ተረድቶ ልጄ በጥናቱ እንዲሳተፍ መፍቀዴን በፊርማዬ አረጋግጣለሁ።

የቤተሰብ ስም-----

የቤተሰብ ፊርማ-----

ቀን-----

**መጠይቅ**

ይህ መጠይቅ በዶ/ር ዳኒዲላ ዋቅጂራ የሚደረግ የጥናቱ አካል ነው።

የህፃኑ መለያ ቁጥር፡-----

**ክፍል 1:ጠቅላላ መረጃ**

1. ያታ
  1. ወንድ
  2. ሴት
2. ብሄርህ/ሽ ምንድን ነው
  1. ጌድኦ
  2. ኦሮሞ
  3. አማራ
  4. ጉራጌ
  5. ሌላይጥቀስ-----
3. እምነትህ/ሽ ምንድን ነው
  1. ኦርቶዶክስ
  2. ፕሮቴስታንት
  3. ኢስላም
  4. ካቶሊክ
  5. ሌላ ( ይጥቀስ)-----
4. ስንተኛ ክፍል ነው የምትማሪው/ረው?-----

**ክፍል: 2 ስለራስህ/ሽ የጥርስ አቀማመጥ ያለህ ግንዛቤ**

1. የብሪስ ህክምና ያስፈልግህል/ያስፈልግሻል ?
  1. አዎ
  2. አይ
  3. አላውቅም
2. በጥርስ/ሽ መልክ ደስተኛነህ/ሽ
  1. በጣምደስተኛ
  2. ደስተኛ
  3. መካከለኛ
  4. ደስተኛ አይደለሁም
  5. በጣም ደስተኛ አይደለሁም
3. በፊት ለፊት ጥርስ አደራደር /አቀማመጥ ደስተኛ ነህ/ሽ
  1. በጣምደስተኛ
  2. ደስተኛ
  3. መካከለኛ
  4. ደስተኛ አይደለሁም
  5. በጣም ደስተኛ አይደለሁም
4. የተስተካከለ የጥርስ አቀማመጥ በአጠቃላይ የፊት ውበት አስፈላጊ ነው ብለህ/ሽ ታስባለህ/ሽ?

1. በጣም አስፈላጊ
2. አስፈላጊ
3. ለውጥ የለውም
4. አስፈላጊ አይደለም
5. በጣም አስፈላጊ አይደለም

5. ከታች ያለውን ምስል ተመልክተህ/ሽ የአንተን /የአንቺን ጥርስ ምስል ምረጥ/ጭ-----

**ክፍል 3: የቤተሰብ መጠይቅ**

መመሪያ: እባክዎን ትክክለኛውን መልስ ከተሰጡት ምርጫዎች ውስጥ ይምረጡ

1. የእናት ስራ
  1. የቤት እመቤት
  2. ነጋዴ
  3. የመንግስት ሰራተኛ
  4. የቀን ሰራተኛ
  5. ሌላ ካለ ይጥቀሱ-----
2. የአባት ስራ
  1. ነጋዴ
  2. ገበሬ
  3. የመንግስት ሰራተኛ
  4. የቀን ሰራተኛ
  5. ሌላ ካለ ይጥቀሱ-----
3. የእናት የትምህርት ደረጃ
  1. መፃፍና ማንበብ የማይችል
  2. መፃፍና ማንበብ የሚችል
  3. ክፍል 1-4
  4. ክፍል 5-8
  5. ክፍል 9-12
  6. ዩኒቨርሲቲ ( ኮሌጅ) ከዛ በላይ
4. የአባት የትምህርት ደረጃ
  1. መፃፍና ማንበብ የማይችል
  2. መፃፍና ማንበብ የሚችል
  3. ክፍል 1-4
  4. ክፍል 5-8
  5. ክፍል 9-12
  6. ዩኒቨርሲቲ ( ኮሌጅ) ከዛ በላይ
5. የቤተሰብ አማካይ የወር ገቢ-----
6. ምስሉን ተመልክተው የልጅን ጥርስ የሚመስለውን የምስል ቁጥር ይፃፉ-----



**Assurance of principal investigator**

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of Faculty of Public Health in effect at the time of grand is forwarded as the result of this application.

Name of student: - \_\_\_\_\_

Date: - \_\_\_\_\_ signature \_\_\_\_\_

Approval of Advisor

Name of Advisor \_\_\_\_\_

Date:- \_\_\_\_\_ Signature:- \_\_\_\_\_