

# Oral Health Challenges in Refugees from the Middle East and Africa – a Comparative Study

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# Oral Health Challenges in Refugees from the Middle East and Africa – a Comparative Study

## ABSTRACT

**BACKGROUND:** The aim was to explore and compare oral health and need for dental treatment in newly arrived refugees from the Middle East and Africa to Norway. **METHOD:** Oral examination and structured interviews were performed with attending interpreters. Associations between origin and measures for oral health were studied with multiple linear regression.

**RESULTS:** Half of the refugees (n=132) reported oral impacts on daily performances (OIDP) and mean number of decayed teeth (DT) was 4.3 (SD 3.5). Refugees from the Middle East had more DT (1.38, p=0.044), higher sum of decayed, missing and filled teeth (DMFT) (3.93, p=0.001) and lower OIDP-score (-3.72, p=0.026) than refugees from Africa. **DISCUSSION:** Refugee oral health is generally poor, with more extensive challenges in refugees from the Middle East. However, few missing teeth, and manageable caries-gradient at the time of registration indicate that most refugees have the prerequisites for a good dentition, provided they get the necessary treatment.

**Keywords:**

Oral health · Refugees · Decayed, missing and filled teeth · Quality of life

**INTRODUCTION**

Europe has experienced a historical influx of refugees and asylum seekers driven by conflicts, violence and poverty in African and Middle Eastern countries [1]. The receiving and integrating of these new citizens entails complex social and economic challenges, and new demands are placed on the existing health-care systems.

Oral health is often under-communicated or neglected in general and specialized health care services, despite its clear impact on quality of life [2]. It is not represented in the dominating Norwegian hospital-journal [3], and to our knowledge Canada is the only country that has developed specific guidelines for oral screening of refugees and immigrants [4].

Oral pain, infections or missing teeth may have serious physical, social and psychological consequences and even affect the ability to speak [2], which is important when learning a new language. A survey of Syrian refugees in Jordan revealed that 40% of the respondents reported need for dental services [5], and in a refugee camp in Brussels, dental caries was the second most common primary diagnosis [6]. Prior American and Australian research indicated considerably higher dental treatment needs in newly arrived refugees compared to the general

population [7-9]. Conclusions from these studies suggested an urgent need for the inclusion of refugees in targeted dental services, and resettlement programmes should include dental screening, treatment and oral health education to prevent a further decline in dental health status [8-9]. A recent pilot study from Finland demonstrated dental treatment need in most asylum seekers and two-thirds of other immigrants. Access to dental services was considered a major challenge [10].

A series of factors are associated with poor oral health conditions in refugees. There is limited access to dental care, both in native countries and during migration [7, 11]. Dental clinics may be destroyed or closed during conflicts, which according to Saltaji [12] was seen recently in Syria, where many dental clinics were affected, and health personnel fled the country. Health clinics in refugee camps have limited resources for the treatment of dental diseases [5], and when settling in Western countries, some migrant groups are introduced to more high-sugar foods than they are accustomed to [13, 14]. Refugees in the process of resettlement may have more pressing problems than oral health, and previous research demonstrated a tendency to under-utilize dental services and seek emergency dental treatment only [7-9, 15]. Other important barriers to the seeking of dental care are limited income, language difficulties, fear, education and cultural barriers, such as differences in perceptions of oral health, alternative beliefs about dental care, and unfamiliarity with health-care services in a foreign country [7, 8, 10].

Little emphasis was placed on oral health research in adult refugees in European countries during the last 25 years [11]. Refugee populations are fluctuating and exhibit considerable variations in dental treatment experience and risks for oral disease. Oral health challenges are not

homogenous across African and Middle Eastern countries. Despite a high rate of untreated caries in general, caries prevalence is lower in most African countries than in more industrialized countries in the Middle East [16]. Thus, it should be of interest to study whether this difference is reflected in refugee oral health. To consider calls for action in European dental health-services, there is a need to investigate the expected burden of oral health problems associated with the current refugee influx.

The aim of the study was to explore oral health and need for dental treatment in newly arrived refugees from Africa and the Middle East. The secondary aim was to test the hypothesis that there are differences in oral health-challenges between refugees from Africa and the Middle East.

## **METHODS**

### **Participants and Data Collection**

The sample consisted of individuals with refugee status in Norway, both resettlement refugees and asylum seekers granted permanent residency. Data collection was performed between December 2013 and June 2015. On arrival in Norway, the Norwegian Directorate of Immigration (UDI) distribute all refugees randomly to reception centers throughout the country [17]. All regular centres (8) within commuting-distance to Oslo were invited to the study, and agreed to participate. At the time of data-collection, few refugees from outside

Africa or the Middle East were granted residency in Norway [18]. Thus, adult refugee residents from Africa or the Middle East were invited to the study. Exclusion criteria were (i) age 18 years or younger, (ii) living time in Norway more than 2 years, (iii) not fluent in one of the five most common languages currently spoken by refugees in Norway (Arabic, Sorani, Tigrinya, Amharic and Somali), or Norwegian or English. Data collection was planned on days where the refugees had no activities outside the reception centers. With 3 exceptions, all invited refugees who were in the area on the planned days of data collection agreed to take part in the study. In total, 132 refugees gave written informed consent to participate.

Sample size was estimated from comparison of caries prevalence in refugees from Africa and the Middle East. Standard deviation (3.1 units) and clinical relevant difference (2 units) was retrieved from Davidson [9]. Significance level was set to 5%, power 90% and group-size ratio 2:1, with twice as many African refugees at the time of investigation. We calculated a need for at least 78 and 39 refugees from Africa and the Middle East respectively, which represents 2 percent of all refugees from the two areas [17].

Data collection included questionnaires and oral examination with attending interpreters, and was conducted in regular rooms at the reception centers. A trained dentist (the first author) performed all interviews and oral screening. The questionnaires were read loud and registered by the interviewer. The interpreters used written professional translations [19] of the interview guide to ensure equality in the translation process.

Oral examination was conducted according to methods described by Singh et al. [20]. The dentist used a penlight and headlight, disposable mouth mirror, disposable gloves and sterile gauze to inspect all quadrants of the mouth. Blunt toothpicks were used to record plaque and gingival indexes. Intra-oral photographs were taken for documentation, with consent from the subjects. Radiographs were not available.

### **Measures**

Socio-demographic variables recorded were age, gender, educational level (Table 1), country of birth, and preferred language to discuss health issues.

Self-perceived oral health was explored by four questions. “How would you describe the health of your teeth or mouth?” (excellent/very good/good/fair/poor) was dichotomized into “good” (excellent/very good/good) and “not good” (fair/poor). “Do you think you have any untreated dental conditions?” and “Are you satisfied with your own teeth?” had the options “yes” or “no”. “Do you suffer from toothache or other pain in the mouth?” (not at all/a little/quite a bit/extremely) was dichotomized into “no problem with pain” (not at all/a little) and “regular oral pain” (quite a bit/extremely)”.

The Oral Impacts on Daily Performance (OIDP) instrument [21, 22] was used to measure oral health-related quality of life. The questionnaire contains eight questions (Table 2) about how often during the last 6 months, problems with an individual’s teeth or dentures caused any

difficulty with the common daily performance of activities. Response alternatives and scores are: Every day (1), once-twice a week (2), once-twice a month (3), less than once a month (4), and never (5).

Utilization of dental services was measured asking “Have you ever in your life visited a dentist?” (yes/no). If yes: “Do you seek dentists for regular check-ups or only for emergency dental treatment?” Participants who had never seen a dentist, or only on emergency basis, were asked an open-ended question about why. Answers were categorized retrospectively (Results-section). Participants also answered open-ended questions about dental cleaning habits (equipment used regularly), and frequency of oral cleaning (times per day).

Numbers of decayed (DT), filled (FT), and missing teeth (MT) were recorded. DT were defined according to Singh et al. [20] as 0.5 mm or more of tooth structure lost at the enamel surface and brown coloration of cavity walls. Decayed teeth with fillings were recorded only as DT, to enable calculation of sum of decayed, missing and filled teeth (DMFT). A probe was not used because of ethical considerations. Teeth with mobility > grade 1 were scored as mobile. All signs of oral pathology were recorded and described as well as presence or absence and condition of dentures.

### **Analysis**

Intra-examiner agreement was tested via patient examination at the Dental Faculty in Oslo and resulted in Cohen’s Kappa of 0.91.

Statistical analyses were performed using SPSS 24.0 (Chicago, IL, USA). Differences between groups were tested using Pearson's chi-squared tests for categorical variables and unpaired t-tests for continuous variables. Associations between origin and DT, DMFT and OIDP sum-score were studied with multiple linear regression with adjustment for age, gender and education. Assumptions for linear regression models were checked and adequately met.

### **Ethics**

The Norwegian Directorate of Immigration (UDI) and the Norwegian Ethics Committee approved the project (2013/1080/REK South-East A).

### **RESULTS**

Table 1 shows the demographics of the study sample, which consisted of 132 relatively young refugees (median age=28.5) of which 71.2% were men. In both groups, approximately 10% were illiterate, whereas the percentage with a university degree was higher among refugees from the Middle East (33%) than from Africa (9%).

Half of the refugees (50.4%) reported one or more weekly oral impacts on daily performances. OIDP sum-score was 30.4 (SD 10.0) and 33.3 (SD 7.4) in Middle Eastern and African refugees respectively ( $p=0.062$ ). There were no significant gender differences in mean OIDP-scores.

Table 2 gives an overview of self-reported oral health and OIDP. Refugees from the Middle East were less satisfied with their teeth ( $p=0.024$ ), and expressed more trouble with sleep and relaxation ( $p=0.018$ ) and with taking part in social activities ( $p=0.021$ ) due to oral health problems than refugees from Africa.

A total of 33.3% of participants had no previous experience with dental visits, 48.3% of Africans and 4.4% of refugees from the Middle East ( $p=0.001$ ). Of participants with dentist experience, 69.6% of Africans and 60.5% from the Middle East had only received emergency treatment ( $p=0.368$ ). Of the 108 refugees (81.8%) who claimed not to engage in regular dental visits, 42.9% of African participants reported “I don’t think I need dental treatment” as a main reason, compared to 15.6% of participants from the Middle East ( $p=0.007$ ). Other prominent explanations were cost (Middle East: 68.8%, Africa: 34.2%,  $p=0.001$ ), problems with understanding the Norwegian dental care system (Middle East: 43.8%, Africa: 22.4%,  $p=0.025$ ), lack of time or energy to prioritize it (Middle East: 15.6%, Africa: 19.7%,  $p=0.615$ ), and language difficulties (Middle East 18.8%, Africa 9.2%,  $p=0.164$ ). Only 3% of the refugees reported dental fear as a reason for not seeking dental treatment.

Overall, 89.4% of the refugees had at least one carious tooth (median=3.5). One or more mobile teeth (degree 2-3) were found in 36.4%, and signs of oral-pathological conditions in 9.8%. Only three participants had dentures, which were all in need of repair. No significant gender differences in dental status were found.

Table 3 presents DMFT-numbers, with comparison of refugees from Africa and the Middle East. Mean DT was high in both groups, although higher in refugees from the Middle East ( $p=0.039$ ), who also presented with higher mean FT ( $p=0.001$ ) and DMFT ( $p=0.001$ ). Total mean MT was 1.4.

Almost all participants (96.2%) used a toothbrush regularly, whereas few were familiar with floss /toothpicks (5.3%) or mouth-rinse (3.8%). Some of the refugees (6.1%) also used a stick-brush either solely or in addition to tooth-brushing. With respect to dental care-equipment there were no significant differences between regions of origin, but oral cleaning at least once a day was significantly more common among African refugees (100%) than in refugees from the Middle East (86.7%) ( $p=0.001$ ). Brushing twice a day or more was reported by 63.7% (Middle East: 53.3%, Africa: 69.0%,  $p=0.077$ ). There were no significant gender differences.

Table 4 shows associations between origin and number of decayed teeth, DMFT and OIDP sum-score in a multiple linear regression model. When adjusted for age gender and level of education, origin was significantly associated with all the dependent variables, with more decayed teeth, higher DMFT and more oral impacts on daily performances (lower OIDP sum-score) in refugees from the Middle East.

## DISCUSSION

Most of the refugees had clinically detectable caries, with significantly higher caries burden in refugees from the Middle East. On the other hand, mean number of missing teeth was low. Half of the participants reported one or more negative impacts on daily life at least once weekly due to dental problems.

The majority of the refugees assessed their oral health as poor and believed to be in need of dental treatment. In a recent study of Syrian refugee children, Pani et al. [23] found that oral health challenges adversely affected their quality of life, with dental pain leading to anger, frustration and “change of psyche”. In the present study, origin was significantly associated with OIDP, with more oral impacts in refugees from the Middle East than from Africa.

Language, culture and socio-economic factors are prominent barriers to care-seeking [24]. Significantly more refugees from the Middle East reported cost and problems with understanding the Norwegian health-care system as barriers to seeking dental care compared to participants from Africa. This fits well with the lower degree of perceived oral health problems in African participants.

Clinical examination revealed poor oral health status in refugees overall compared to the average population in most European countries [25-27]. Compared to Norwegian adults, the mean number of decayed teeth in the study sample was four times higher, and the mean number of filled teeth was six times lower [27], reflecting a high need for dental services. These findings are consistent with results from

overseas studies [7-9, 14]. Previous studies also demonstrated that oral health status in refugees was poorer than in other immigrant groups [7, 9, 10].

The total caries burden was significantly higher in refugees from the Middle East compared to Africans. There are no indications of higher DMFT in the African and Middle Eastern region than in European populations, but rates of untreated caries are higher, especially in Middle Eastern countries [16, 25]. DT-numbers are lower in most African countries [16], despite the lower access to dental services, as confirmed by the present study. The higher caries rates in the Middle East are often seen in connection with exposure to Western diet in developing countries, and dental policies failing to control excessive sugar consumption [28]. But other explanatory factors, such as tooth cleaning habits and access to fluoride must also be considered.

Fluoride is an important factor in preventing caries although too high levels may disturb dental development. High content of fluoride in the groundwater is found in an area extending from Syria to Kenya [29], and therefore is not likely to explain oral health-disparities between Africa and the Middle East.

Tooth-brushing was a daily habit for all the African participants, compared to 87 percent of refugees from the Middle East. The African countries where most participants originated from, were Eritrea and Somalia. There is little research on Eritrean oral health, but several studies emphasize the importance of oral hygiene in Somalian culture and religion [13-15]. Moreover, traditional Somalian diet is low in fat and sugar, which may contribute to the lower caries prevalence in the African participants. But research has demonstrated a tendency of

Somali refugees to easily adapt to a Western diet [13, 14]. Therefore, dietary information to encourage continuation of positive cultural traditions may be important to emphasize in future reception programs. The use of stick-brush may have been under-reported because of the open-ended nature of the question. Adams et al. [15] revealed that Somali refugees preferred the stick-brush after resettlement, but that it may be difficult to obtain in some Western countries.

Some limitations should be acknowledged. Measurement errors are likely, especially response errors related to self-reported oral health and OIDP. The participants talked different languages, and despite professional written translations of all questions to guide the interpreters, misunderstandings could happen. Due to the amount of languages and lack of qualified translators, it was not feasible to have the OIDP-inventory back-translated. To ensure equality, and avoid stigmatizing illiterate participants, all questions were asked orally.

Some oral health-issues, like tooth-grinding, jaw pain and need for orthodontic treatment were not registered systematically, and the study did not include radiographs. Available radiographs would likely have increased caries prevalence and strengthened the results of the study, and is thus not perceived as a limitation.

A major advantage is the representativeness of the study. Examination at the refugees' residence and avoiding exposure to sharp instruments probably contributed to the high participation rate. The convenience sample of reception centers is not likely to affect generalizability, since refugees are distributed randomly to Norwegian centers [17]. The sample size was sufficient, and the probability of inter-examiner variation was low. Furthermore, the probability of measurement error in the independent variables was low, since responses

were confirmed by the Norwegian directory of immigration. The use of internationally accepted instruments for the dependent variables allows for international comparisons.

In conclusion, oral health is generally poor in all current refugee groups, and has considerable impact on daily-life situations. Despite the high caries burden, most caries was treatable at registration. This, and the low number of missing teeth, indicate that most refugees have the prerequisites for good dentition, provided they get the necessary dental treatment. Including oral health in refugee health-programs may prove to be beneficial to both patients and community.

The hypothesis that there are differences in oral health-challenges between refugees from Africa and the Middle East is supported, which may give some indications of future demands on oral health services.

Newly arrived refugees are preoccupied with the resettling-process, and are not likely to prioritize oral health. The results of this study support recommendations to include oral screening and referral for dental treatment in primary health-care for refugees. General practitioners should be encouraged to ask refugees about their oral health.

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### **Ethical approval**

All procedures performed in studies involving human participants were in accordance with the ethical standards of the Norwegian Ethics Committee and with the 1964 Helsinki declaration and its later amendments.

### **Conflict of interest**

All authors declare that they have no conflict of interest.

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**Table 1 – Demographic characteristics of the study sample**

		<b>Total</b>	<b>Middle East<sup>1</sup></b>	<b>Africa<sup>2</sup></b>	<b>Test value (df)</b>	<b>P</b>
		<b>(n=132)</b>	<b>(n=45)</b>	<b>(n=87)</b>		
<b>Gender</b>	Male	94 (71.2)	36 (80.0)	58 (66.7)	2.57 (1)*	0.109*
<b>n (%)</b>	Female	38 (28.8)	9 (20.0)	29 (33.3)		
<b>Education</b>	No	14 (10.6)	5 (11.1)	9 (10.3)	13.57 (4)*	0.009*
<b>n (%)</b>	1-7 years	24 (18.2)	6 (13.3)	18 (20.7)		
	8-10 years	30 (22.7)	6 (13.3)	24 (27.6)		
	11-13 years	41 (31.1)	13 (28.9)	28 (32.2)		
	> 13 years	23 (17.4)	15 (33.4)	8 (9.2)		
<b>Age</b>	Mean(SD)	31.8 (11.6)	34.8 (12.6)	30.3 (10.8)	2.17 (130)**	0.032**

<sup>1</sup> Syria (39), Iran (4), Iraq (1), Afghanistan (1)

<sup>2</sup> Eritrea (54), Somalia (24), Sudan (8), Nigeria (1)

\* Calculated using Pearson's chi-squared test

\*\*Calculated using unpaired t-test

**Table 2** – Self reported oral health and oral impacts on daily performances (OIDP)

	Total n = 132	Middle East n = 45	Africa n = 87	Test value (df)*	P*
“How would you describe the health of your teeth or mouth?” % “Not good”	63.6	71.1	59.8	1.65 (1)	0.199
“Do you think you have any untreated dental conditions?” % “Yes”	76.5	80.0	74.7	0.46 (1)	0.497
Are you satisfied with your own teeth?” % “No”	50.8	64.4	43.7	5.12 (1)	<b>0.024</b>
Do you suffer from toothache or other pain in the mouth?” % “Regular oral pain”	37.9	40.0	36.8	0.13 (1)	0.718
<u>% reporting problems once a week or more often with... ...due to problems with teeth or dentures (OIDP):</u>					
...eating and enjoying food...	37.9	44.4	34.4	1.25 (1)	0.263
...speaking and pronouncing clearly...	10.6	15.5	8.0	1.76 (1)	0.184
...tooth cleaning...	31.8	35.5	29.9	0.44 (1)	0.507
...sleep and relaxation...	14.4	24.4	9.1	5.60 (1)	<b>0.018</b>
...smiling and showing teeth without being embarrassed...	21.2	28.9	17.2	2.41 (1)	0.121
...being emotionally stable...	12.9	20.0	9.1	3.09 (1)	0.079
...being sociable (enjoying being with other people)...	12.9	22.2	8.0	5.31 (1)	<b>0.021</b>
...performing daily work / daily chores...	11.4	17.7	8.0	2.79 (1)	0.095

\*Calculated using Pearson’s chi-squared test

**Table 3** – Mean numbers of decayed, missing and filled teeth and sum of decayed, missing and filled teeth (DMFT), overall and in refugees from the Middle East and Africa

	<b>Total</b> <b>n = 132</b>	<b>Middle East</b> <b>n = 45</b>	<b>Africa</b> <b>n = 87</b>	<b>Test value (df)*</b>	<b>P*</b>
<b>Decayed teeth, mean (SD)</b>	4.3 (3.5)	5.2 (4.2)	3.9 ( 2.9)	2.08 (130)	0.039
<b>Missing teeth, mean (SD)</b>	1.4 (2.4)	1.6 (3.4)	1.3 (1.7)	0.71 (130)	0.479
<b>Filled teeth, mean (SD)</b>	1.7 (3.4)	3.9 (4.9)	0.5 (1.4)	6.05 (130)	0.001
<b>DMFT, mean (SD)</b>	7.4 (5.8)	10.7 (6.8)	5.7 (4.3)	5.18 (130)	0.001

\*Calculated using unpaired t-test

**Table 4** – Differences in mean values for number of decayed teeth (DT), sum of decayed, missing or filled teeth (DMFT) and sum-score for oral impact on daily performances (OIDP) between refugees from Africa and the Middle East – unadjusted, and adjusted for age, gender and level of education.

Dependent variables	Independent variables	Unadjusted				Adjusted				R <sup>2</sup>
		B	S.E	95% CI	p	B	S.E.	95% CI	p	
<b>Number of decayed teeth (DT)</b>	Origin (Africa / Middle East)	1.30	0.63	0.06; 2.54	<b>0.039</b>	1.38	0.68	0.04; 2.73	<b>0.044</b>	0.061
	Age (continuous)	0.01	0.01	-0.05; 0.05	0.963	-0.02	0.03	-0.07; 0.04	0.577	
	Gender (male / female)	-0.11	0.67	-1.43; 1.20	0.864	-0.24	0.69	-1.61; 1.15	0.732	
	No education	1.72	0.97	-0.19; 3.64	0.078	1.98	1.21	-0.40; 4.37	0.102	
	Education 1-7 years	0.07	0.78	-1.48; 1.62	0.929	0.58	1.05	-1.49; 2.65	0.582	
	Education 8-10 years	-0.63	0.72	-2.05; 0.79	0.383	0.062	1.00	-1.92; 2.04	0.951	
	Education 11-13 years	-0.36	0.65	-1.64; 0.93	0.586	0.14	0.92	-1.69; 1.97	0.877	
	University education	0.09	0.80	-1.48; 1.66	0.911	Ref.				
<b>Sum of decayed, missing or filled teeth (DMFT)</b>	Origin (Africa / Middle East)	5.01	0.97	3.10; 6.93	<b>0.001</b>	3.93	1.01	1.94; 5.92	<b>0.001</b>	0.265
	Age (continuous)	0.18	0.04	0.09; 0.26	<b>0.001</b>	0.14	0.04	0.06; 0.22	<b>0.001</b>	
	Gender (male / female)	-1.10	1.11	-3.29; 1.09	0.322	0.27	1.03	-1.76; 2.30	0.793	
	No education	1.27	1.63	-1.96; 4.50	0.437	-0.66	1.78	-4.18; 2.87	0.713	
	Education 1-7 years	-1.16	1.30	-3.73; 1.42	0.376	-1.87	1.54	-4.93; 1.18	0.227	
	Education 8-10 years	-1.98	1.19	-4.33; 0.37	0.098	-2.07	1.48	-5.00; 0.85	0.163	
	Education 11-13 years	-0.21	1.09	-2.36; 1.94	0.848	-1.22	1.36	-3.92; 1.48	0.374	
	University education	3.09	1.30	0.52; 5.66	<b>0.019</b>	Ref.				
<b>Oral impact on daily performances (OIDP)</b>	Origin (Africa / Middle East)	-2.90	1.54	-5.95; 0.15	0.062	-3.72	1.66	-6.99; -0.44	<b>0.026</b>	0.076
	Age (continuous)	-0.04	0.06	-0.16; 0.09	0.582	-0.04	0.07	-0.17; 0.09	0.588	
	Gender (male / female)	-2.33	1.62	-5.54; 0.88	0.153	-2.96	1.69	-6.30; 0.39	0.083	
	No education	1.30	2.40	-3.45; 6.05	0.589	0.20	2.94	-5.61; 6.01	0.946	
	Education 1-7 years	-2.57	1.91	-6.34; 1.21	0.181	-3.93	2.54	-8.97; 1.10	0.125	
	Education 8-10 years	1.04	1.76	-2.45; 4.53	0.558	-1.58	2.43	-6.40; 3.24	0.518	
	Education 11-13 years	-0.39	1.60	-3.55; 2.78	0.810	-2.26	2.25	-6.71; 2.19	0.317	
	University education	1.10	1.95	-2.76; 4.96	0.573	Ref.				

