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研究題目：Association of oral health literacy with oral health behavior and oral health status in Belarus

目的 (Objective)：

Many studies have established the importance of oral health literacy as a determinant of oral health. Low oral health literacy was found to be associated with limited awareness of oral health, irregular dental visits and ignorance of preventive care. The objectives of this study were : 1. to explore oral health literacy level among adults in Belarus, and 2. to analyze the associations between oral health literacy, socio-demographic status, health behaviors and oral health status.

対象および方法 (Materials and methods)：

Subjects : Subjects of this study were adult patients aged 18 to 60 years who visited dental division of the district hospital in urban area of Belarus during July and August of 2013, and without physical or mental disabilities.

Questionnaire survey : Subjects filled out a self-administered questionnaire collecting information about socio-demographics (gender, age, and education), health behaviors (smoking, regularity of dental visits, and tooth brushing frequency) and completed the oral health literacy test (R-OHLI). The R-OHLI is a Russian language version of the Oral Health Literacy Instrument (OHLI) translated and modified for Belarusian population by research team. The R-OHLI has a reading comprehension section to assess individual's oral health literacy level. The instrument also includes a numeracy section which evaluates an individual's ability to perform basic mathematic operations necessary to understand medication prescriptions and postoperative instructions. In total, the R-OHLI is composed of 57 items : 38 items in the reading comprehension and 19 items in the numeracy sections. Each item is scored with 1 if correct or 0 if incorrect or unanswered. The section's scores are a weighted sum of the correct items : the scores of reading comprehension and numeracy sections are multiplied by 1.316 (50/38) and 2.632 (50/19), respectively, so that the scores for both sections range from 0 to 50. The total R-OHLI score therefore ranges from 0 to 100. To categorize subjects into three oral health literacy levels, following cutoff-points were used inadequate (0-59), marginal (60-74) and adequate (75-100).

Clinical examination : Clinical oral examination was performed by with subjects sitting in a dental chair. An operatory light, a dental mirror, an explorer and a periodontal probe were used for the examination. Oral examination was performed according to WHO recommendations and included tooth status (numbers of decayed, missing and filled teeth), oral hygiene, pocket depth, and gingival bleeding on probing. Third molars were excluded from the

examination. Oral hygiene status was assessed with Silness-Löe plaque index (PLI) (Silness and Loe, 1964). Pocket depth was measured using the UNC 15 probe (Hu-Friedy, Hu-Friedy Mfg. Co., Chicago, IL) on each tooth surface circumferentially and the deepest measurement in millimeters was scored for each tooth. Periodontal pockets with 4 mm and deeper were considered as deep pockets. Presence of bleeding on probing was assessed for each tooth following the pocket depth examination.

結果および考察 (Results):

In total, 281 subjects with the mean age 33.1 ± 12.2 years participated in the study. The majority of subjects (64.1%) were women; mean ages of male and female subjects were 28.0 ± 10.3 and 35.9 ± 12.3 years, respectively. As for education, 21.8% of males and 26.1% of females had higher education; the distribution of male and female subjects by education level was not significantly different. The mean ages of subjects with and without university degree were also not significantly different: 35.3 ± 11.3 and 32.3 ± 12.4 years, respectively.

The mean R-OHLI score was 77.2 ± 14.5 in total. The mean R-OHLI scores for male and female subjects were 73.6 ± 16.4 and 79.3 ± 13.6 , respectively, and significantly different ($p < 0.01$). For education, the mean R-OHLI score for subjects with university degree (83.5 ± 10.0) was significantly higher than that for those without (75.2 ± 15.1) ($p < 0.001$). For smoking behavior, no significant difference in the mean R-OHLI scores between smokers (78.1 ± 14.0) and nonsmokers (74.5 ± 15.7) was observed. Subjects who visited a dentist regularly had a significantly higher mean R-OHLI score (79.3 ± 14.0) than those who did not (75.1 ± 14.8) ($p < 0.05$). The R-OHLI scores were higher among subjects who brushed their teeth twice a day or more (77.9 ± 14.7) comparing to those who did not (75.9 ± 14.1), but not significantly different.

Analysis of oral health literacy by three literacy levels showed that the majority of subjects (68.7%) had an adequate oral health literacy level, while 18.9% and 12.4% belonged to marginal and inadequate oral health literacy levels. There was a significant difference in distribution of oral health literacy levels by gender and education. The proportion of subjects with adequate oral health literacy level was significantly higher among females and those with university education. For oral health literacy level by health behaviors such as smoking, regularity of dental visits and tooth brushing frequency, there were no significant distributional differences found.

The mean numbers of decayed teeth, missing teeth, filled teeth, PLI, number of teeth with deep pockets and gingival bleeding on probing were 1.7 ± 2.2 , 2.7 ± 3.8 , 6.2 ± 4.6 , 0.8 ± 0.5 , 2.6 ± 4.3 and 6.1 ± 5.0 , respectively. In bivariate analyses (Table 1), subjects with adequate oral health literacy level had significantly lower number of missing teeth comparing to their counterparts ($p < 0.05$ and $p < 0.01$) and higher number of filled teeth than those with inadequate ($p < 0.01$). The same tendency was observed for PLI; oral hygiene condition was significantly

better among subjects with adequate oral health literacy level than their counterparts ($p < 0.05$ and $p < 0.01$). No significant relationship was observed for number of decayed teeth, number of teeth with deep pockets or gingival bleeding on probing.

Table 1. Oral health status (mean \pm SD) by oral health literacy level.

Oral health literacy level	Decayed teeth	Missing teeth	Filled teeth	PLI	Deep pockets	BOP
Inadequate	2.0 \pm 1.9	4.8 \pm 5.5	3.9 \pm 3.4	0.9 \pm 0.5	3.0 \pm 4.4	5.7 \pm 4.1
Marginal	2.1 \pm 2.8	2.6 \pm 4.1	5.5 \pm 4.3	0.9 \pm 0.4	2.9 \pm 4.8	7.3 \pm 4.7
Adequate	1.5 \pm 2.1	2.4 \pm 3.2	6.8 \pm 4.8	0.7 \pm 0.5	2.5 \pm 4.1	5.8 \pm 5.1

SD, standard deviation

After adjusting for socio-economic and behavioral characteristics (Table 2), plaque index was no longer significantly associated with oral health literacy level. Numbers of missing and filled teeth were still significantly different between subjects with adequate literacy level and those with inadequate ($p < 0.01$ and $p < 0.05$, respectively).

Table 2. Oral health status (adjusted mean \pm SD) by oral health literacy level, adjusted for gender, age, education, smoking behavior, regularity of dental visits, tooth brushing frequency and PLI.

Oral health literacy level	Decayed teeth ^a	Missing teeth ^a	Filled teeth ^a	PLI ^b	Deep pockets ^a	BOP ^a
Inadequate	1.7 \pm 2.1	4.3 \pm 2.9	4.5 \pm 4.2	0.9 \pm 0.5	2.6 \pm 4.0	5.0 \pm 4.6
Marginal	1.8 \pm 2.1	2.8 \pm 2.9	6.2 \pm 4.2	0.8 \pm 0.5	3.0 \pm 3.9	6.8 \pm 4.6
Adequate	1.6 \pm 2.1	2.4 \pm 2.9	6.6 \pm 4.2	0.7 \pm 0.5	2.5 \pm 3.9	6.0 \pm 4.6

^aAdjusted for gender, age, education, smoking behavior, regularity of dental visits, tooth brushing frequency and PLI ^bAdjusted for gender, age, education, smoking behavior, regularity of dental visits and tooth brushing frequency SD, standard deviation

The association with socio-demographics found that oral health literacy significantly differed by gender and education level. Female subjects had the higher mean R-OHLI score, and the proportion of adequate oral health literacy level was significantly higher in females comparing to males. Moreover, subjects with university degree had significantly higher R-OHLI scores, and the proportion of those with inadequate oral health literacy was very small.

In the present study, no significant association was observed between oral health literacy and smoking behavior. Similarly, although the mean R-OHLI scores were higher among subjects who visited a dentist regularly and brushed their teeth twice or more a day, the relationship between oral health literacy level and these behaviors was not strong enough to be significant.

In contrast, oral health status was significantly related to oral health literacy level. Subjects with higher oral health literacy levels had lower number of missing teeth and higher number of filled teeth. Subjects with lower oral health literacy may be reluctant to visit a dentist until they have a pain, which leads to aggravation of cases, and ends up with the increased risk of tooth extractions. On the other hand, subjects with high oral health literacy may be more

likely to complete dental treatment even if it requires several visits, which results in higher number of teeth with restorations and lower tooth loss consequently, comparing to the individuals with lower oral health literacy.

This study showed that adequate oral health literacy was strongly related with better oral health outcomes. These findings indicate that improvement of oral health literacy can contribute to the advancement of population oral health. Adequate oral health education at each life stage, starting from the childhood, can contribute to the improvement of oral health status in Belarus.

成果発表 (Presentations):

1. A. Blizniuk, S. Furukawa, M. Ueno, Y. Kawaguchi. Reliability and Validity of the Russian Version of the Oral Health Literacy Instrument. 第 63 回日本口腔衛生学会・総会
2014 年 5 月 31 日 (熊本, Oral presentation)
2. A. Blizniuk, T. Zaitso, M. Ueno, Y. Kawaguchi. Association of Oral Health Literacy with Socio-Demographic and Health Behavioral Factors. 11th International Conference of Asian Academy of Preventive Dentistry.
2014 年 9 月 18 日 (Beijing, Poster presentation)
3. A. Blizniuk, M. Ueno, S. Furukawa, Y. Kawaguchi. Evaluation of a Russian version of the oral health literacy instrument (OHLI). BMC Oral Health. 2014 Nov 27 ; 14 : 141. (Journal article)