Objectives: To examine the possible role of genetic susceptibility for fatigue in southern Spanish women with fibromyalgia, by looking at the possible associations of fatigue and single nucleotide polymorphisms in 34 fibromyalgia candidate-genes, at the interactions between genes, and at the associations between gene-physical activity.

Methods: In this cross-sectional study participated 276 women with fibromyalgia. We extracted DNA from saliva in order to analyse gene-polymorphisms related to fibromyalgia susceptibility, symptoms, or potential mechanisms. Accelerometers registered the participants' physical activity and sedentary time. Five dimensions of fatigue were assessed with the Multidimensional Fatigue Inventory. Age, body fat (%), and analgesics and antidepressants consumption were considered as confounders in all analyses. Based on the Bonferroni's and False Discovery Rate (FDR) values, the statistical significance was interpreted.

Results: AT carriers of the rs4453709 polymorphism (sodium channel protein type 9 subunit alpha, SCN9A, gene) showed the highest scores on fatigue. Carriers of the heterozygous genotype of the rs1801133 (methylene tetrahydrofolate reductase, MTHFR, gene) or rs4597545 (SCN9A gene) polymorphisms who were physically active reported lower fatigue compared to their inactive counterparts. Highly sedentary carriers of the homozygous genotype of the rs7607967 polymorphism (AA/GG genotype; SCN9A gene) presented higher fatigue than those with lower levels of sedentary time.

Conclusion: Physical (in)activity behaviours and the SCN9A and MTHFR genes were jointly related to fatigue. Thereby, the potential benefits of following an active lifestyle might be observed more clearly in women with fibromyalgia genetically predispose to higher levels of fatigue.

REFERENCES:

- [1] Bennett RM, et al. *BMC Musculoskelet Disord* 2010;11:134. doi:10.1186/1471-2474-11-134
- [2] McBeth J, Mulvey MR. *Nat Rev Rheumatol* 2012;8:108–16. doi:10.1038/nrrheum.2011.216

Acknowledgement: This work was supported by the Spanish Ministry of Economy and Competitiveness [I+D+i DEP2010-15639, I+D+i DEP2013-40908-R to M.D.-F.; BES-2014-067612 to F.E.-L.]; the Spanish Ministry of Education [FPU13/03410 to D.S.-T.; FPU 15/00002 to B.G.C.]; the Consejería de Turismo, Comercio y Deporte, Junta de Andalucía [CTCD-201000019242-TRA to MD-F.]; and the University of Granada, Plan Propio de Investigación 2016, Excellence actions: Units of Excellence; Unit of Excellence on Exercise and Health (UCEES).

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.7373

THU0469

CLUES TO RECOGNIZE SECONDARY FIBROMYALGIA IN PATIENTS WITH OSTEOARTHRITIS ACCORDING TO A FIBROMYALGIA ASSESSMENT SCREENING TOOL OF SCALES ON A MULTIDIMENSIONAL HEALTH ASSESSMENT QUESTIONNAIRE (MDHAQ/FAST3-F)

Mariam Riad, Isabel Castrejon, Joel Block, Theodore Pincus. *Rush University Medical Center, Chicago, United States of America*

Background: A multidimensional health assessment questionnaire (MDHAQ) includes scales for a self-report painful joint count, symptom checklist, and fatigue visual analog scale (VAS), which may be compiled into a fibromyalgia assessment screening tool (FAST3-F), in addition to physical function, pain VAS, and patient global VAS, compiled into routine assessment of patient index data (RAPID3). FAST3-F agrees >80% with 2011 formal fibromyalgia (FM) criteria in rheumatoid arthritis (RA) patients who have secondary FM.

Objectives: To recognize clues to secondary FM in osteoarthritis (OA) patients seen in routine care, according to FAST3-F, and to analyze MDHAQ demographic and other clinical data in OA patients who did or did not meet MDHAQ/FAST3-F criteria for secondary FM.

Methods: All patients complete an MDHAQ at all visits prior to seeing the rheumatologist at an academic rheumatology site. The 2-page MDHAQ includes RAPID3 to analyze clinical status, and a cumulative 0-3 FAST3-F scale to recognize FM. FAST3-F is scored 0-3, with 1 point each for 0-10 fatigue VAS ≥ 6 , 0-54 self-report joint count ≥ 16 , and 0-60 symptom checklist ≥ 16 . FAST3-F scores of $\geq 2/3$ agree >80% with formal 2011 FM revised diagnostic criteria, based on data for area under the curve (AUC) on receiver operator characteristic (ROC) curves. A two-sample t test was used to compare the two groups; p values were considered significant if ≤ 0.05 .

Results: Among 173 OA patients, 55 (32%) met FAST3-F criteria of $\geq 2/3$ for secondary FM. Patients who met criteria had lower formal

educational level ($p=0.01$ -Table), but did not differ significantly from those who did not meet criteria according to age, sex, or body mass index (BMI) (Table). MDHAQ scores for physical function, pain, patient global assessment, RAPID3, poor sleep quality, anxiety, and depression were significantly higher in the FAST3-F positive than negative patients ($p<0.001$ -Table).

Abstract THU0469 – Table 1. Mean values for demographics and clinical variables at baseline of 173 patients with OA

Mean (standard deviation=SD) or % of variable:	All patients	Fibromyalgia according to FAST3-F		P
		Yes	No	
N (%)	173	42 (24%)	131 (76%)	
Demographics				
Age (years), mean (SD)	66.1 (10.7)	64.5 (11.7)	66.6 (10.5)	0.27
Female, %	84%	88%	82%	0.38
BMI, mean (SD)	32.9 (7.8)	33.8 (6.8)	32.7 (8.0)	0.58
Educational level (years), mean (SD)	13.7 (3.8)	12.0 (3.9)	14.2 (3.6)	0.01
Clinical Variables				
Physical function (0-10), mean (SD)	3.1 (1.9)	4.6 (1.8)	2.6 (1.6)	<0.001
Pain (0-10), mean (SD)	6.9 (2.3)	8.2 (1.5)	6.5 (2.4)	<0.001
Patient global assessment (0-10), mean (SD)	5.9 (2.7)	7.8 (1.9)	5.3 (2.6)	<0.001
RAPID3 (0-30), mean (SD)	15.8 (6.0)	20.4 (4.6)	14.4 (5.7)	<0.001
Sleep quality (0-3.3), mean (SD)	1.4 (1.0)	1.9 (0.9)	1.2 (0.9)	<0.001
Anxiety (0-3.3), mean (SD)	0.7 (0.8)	1.2 (0.8)	0.5 (0.8)	0.001
Depression/feeling blue (0-3.3), mean (SD)	0.6 (0.8)	1.2 (0.8)	0.5 (0.7)	0.001
Clinical diagnosis of depression, %	13%	32%	7%	0.01

Abbreviations: FAST3-F= fibromyalgia assessment screening tool, BMI=body mass index

Conclusion: MDHAQ/FAST3-F provides clues to identify OA patients with secondary FM in routine care. Nonetheless a definitive diagnosis requires a physician. The findings may be useful to recognize a basis for poor responses in clinical care, clinical trials, and other clinical research, and enhance understanding of pain mechanisms in OA versus FM versus OA with FM.

Disclosure of Interests: : None declared

DOI: 10.1136/annrheumdis-2019-eular.5858

THU0470

ASSOCIATION OF SEDENTARY TIME AND PHYSICAL ACTIVITY WITH PHYSICAL FITNESS IN WOMEN WITH FIBROMYALGIA: AN ISOTEMPORAL SUBSTITUTION APPROACH

Cristina Maestre Cascales¹, Blanca Gavilán Carrera², Pedro Acosta Manzano², Milkana Borges Cosic², Alberto Soriano Maldonado³, Ciara Hughes⁴, Fernando Estevez-Lopez². ¹Universidad Politécnica de Madrid, Madrid, Spain; ²University of Granada, Granada, Spain; ³University of Almería, Almería, Spain; ⁴Ulster University, Belfast, United Kingdom

Background: Behaviours of people with fibromyalgia may impact their levels of physical fitness, which is a marker of physical and psychological health^{1,2,3}. However, scarce research has studied the association of sedentary time (ST) and physical activity (PA) with physical fitness. Interestingly, increasing time in one behaviour requires decreasing time in another. Thus, it is also of interest to understand what is the theoretical impact of replacing sedentary time (ST, e.g., sitting) by light or moderate PA (LPA and MPA, respectively) as well as replacing LPA by MPA on physical fitness in fibromyalgia.

Objectives: To assess the association of replacing ST for different physical activity levels (i.e., ST by LPA or MPA) as well as of LPA by MPA with physical fitness in women with fibromyalgia.

Methods: A total of 407 women with fibromyalgia (51.87 $\pm$ 8.01 years old) participated in this cross-sectional study. ST, LPA and MPA were objectively measured with triaxial accelerometer for 7 consecutive days. Vigorous physical activity was not analysed as this is a very uncommon behaviour in the population. Physical fitness was assessed through the Senior Fitness Test Battery plus the handgrip strength test. The associations between the replacement of 30 min/day of ST with an equivalent time of LPA or MPA were tested by isothermal substitution analyses. Body mass index and age were included as covariates.

Results: Replacing 30 minutes of ST with LPA was associated with better strength in upper limb ($B=0.19$), handgrip strength ($B=0.02$) and aerobic fitness ($B=2.29$); all $p<0.03$. Replacing 30 minutes of ST with MPA was related to better strength and flexibility in lower and upper limb (B ranging from 0.43 to 1.97; all $p<0.02$). Finally, replacing 30 minutes of LPA with MPA was associated with better strength and flexibility in lower and upper limb, aerobic fitness and balance (B ranging from 0.15 to 8.54; all $p<0.04$).

Conclusion: Replacing short time periods (30 min) of ST by PA (especially of moderate intensity) was related to better physical fitness. Moreover, to replace 30 min of LPA by MPA was related to better physical fitness. Our findings support the implementation of experimental research to better understand the extent to which replacing sedentary time (by LPA or MPA) or replacing LPA (by MPA) might enhance increase different components of physical fitness in fibromyalgia. Such findings would have direct clinical implications.

REFERENCES:

- [1] Estévez-López, et al. *Disabil Rehabil.* 2018 Feb;40(3):329-337. DOI: 10.1080/09638288.2016
- [2] Gavilán-Carrera B., et al. *Arthritis Care Res.* 2018 Jul. DOI: 10.1002/acr.23717
- [3] Estévez-López, et al. *Rheumatology (Oxford).* 2017 Nov 1;56(11):2015-2024. DOI: 10.1093/rheumatology/kex302

Acknowledgement: This study was supported by the Universidad Politécnica de Madrid and the Spanish Ministry of Economy and Competitiveness (I+D+i DEP2010-15639; I+D+i DEP2013-40908-R, BES-2011-047133; BES-2014 067612) and of Education (FPU 15/00002, FPU 15/00002).

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.3232

THU0471

THE EFFECT OF VIRTUAL REALITY EXERCISES ON PAIN, FUNCTIONALITY, CARDIOPULMONARY CAPACITY AND QUALITY OF LIFE IN FIBROMYALGIA SYNDROME: A RANDOMIZED, SINGLE-BLIND, CONTROLLED STUDY

Musa Polat¹, Abdulvahap Kahveci², Zafer Günendi², Gülçin Kaymak Karataş².

¹Niğde University, Niğde, Turkey; ²Gazi University Faculty of Medicine, Ankara, Turkey

Background: Fibromyalgia Syndrome (FMS) is a clinical condition with many symptoms such as chronic generalized pain, fatigue, sleep disorder, cognitive dysfunction and depressive mood. Management of FMS is difficult and the most important component is regular exercise.¹ In this syndrome, patients generally have compliance and motivation problems in maintenance of exercises. In recent years, exercises, with fun and game components, have been prescribed to increase patient compliance.² Motion-controlled video games targeting virtual reality are examples of these exercises.³

Objectives: To investigate the effect of motion controlled video games on pain, functionality, cardiopulmonary capacity and quality of life in fibromyalgic women.

Methods: Forty women (> 18 years) who have FMS were included in study. Patients were randomized into study and control groups. Control group performed aerobic exercise (cycling, 3 days/week, 20 minutes/day) for 4 weeks. Study group performed virtual reality exercise (Volleyball, Microsoft Xbox Kinect®, 3 days/week, 15 minutes/day) together with cycling exercise. After the four week supervised exercise program, both groups received the same home exercise program for four weeks. All patients were evaluated at baseline, 4th and 8th weeks. Primary outcome measure was Fibromyalgia Impact Questionnaire. Visual Analog Scale (VAS), Hospital Anxiety and Depression Scale, Fatigue Severity Scale (FSS), Symptom Severity Scale, EuroQol-Quality of Life/Visual Analogue Scale (EQ5D-QoL/VAS) and 6 Minute Walk Test (6MWT) were used as secondary outcome measures. Positive and Negative Affect Schedule (PANAS) was used for patient satisfaction. T-test was used to compare demographic data between two groups. Repeated measures ANOVA was used in evaluation of intra-group efficiency of treatment. Treatment group and time interaction was evaluated by two-way analysis of variance. We calculated 20 patients per group, in

order to find 14% minimal clinical difference in Fibromyalgia Impact Questionnaire with 80% power and 0.05 error rate (Tip 1 error).⁴

Results: All patients completed supervised exercise program (4 weeks). 34 patients (17 study group, 17 control group) were evaluated at the 8th week. Age, body mass index, education status, comorbidities and drug use were similar in both groups ($p>0.05$). After four weeks, all outcome measures improved significantly in both groups ($p<0.05$). However, there was no statistically significant difference in all outcome measures between 4th and 8th weeks. Group and time interactions for 6MWT ($F(1.21, 46.33) = 4.04$, $p = 0.043$), FSS ($F(1.61, 61.24) = 4.21$, $p = 0.026$), EQ5D-QoL Scale ($F(2, 76) = 4.55$, $p = 0.014$) and EQ5D-VAS Scale ($F(1.4, 53.55) = 3.59$, $p = 0.049$) were significant only for the study group. In addition, PANAS score was significantly higher in study group ($p < 0.001$).

Conclusion: Virtual reality exercises along with aerobic exercise increase cardiopulmonary capacity and quality of life in FMS. In addition, they increase patient satisfaction and may improve patient compliance to exercise.

REFERENCES:

- [1] Bidonde J et al. Aerobic exercise training for adults with fibromyalgia. The Cochrane Library, 2017.
- [2] Botella C et al. Virtual reality in the treatment of pain. *JCR* 2008;1:93.
- [3] Garcia-Palacios A et al. Integrating Virtual Reality With Activity Management for the Treatment of Fibromyalgia. *The Clinical Journal of Pain*, 2015, 31.6: 564-572.
- [4] Bennett RM et al. Minimal clinically important difference in the fibromyalgia impact questionnaire. *The Journal of Rheumatology*, 2009, jrheum. 081090.

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.6635

THU0472

FIBROMYALGIA SYNDROME IN WEST AFRICA: ACR 1990 IS NOT SENSITIVE FOR THE UNDER-DIAGNOSED AND WIDELY MISUNDERSTOOD DISORDER

Richard Akintayo¹, Bola Ahmed², Kayode Olafimihan³, Foluke Akintayo⁴.

¹University of Ilorin Teaching Hospital, Ilorin, Rheumatology, Ilorin, Nigeria;

²University of Ilorin Teaching Hospital, Ilorin, Orthopaedic Surgery, Ilorin, Nigeria;

³University of Ilorin Teaching Hospital, Family Medicine, Ilorin, Nigeria;

⁴Ladoke Akintola University of Technology Teaching Hospital, Family Medicine, Ogbomoso, Nigeria

Background: Like most poorly understood rheumatic conditions, Fibromyalgia is thought to be rare in West Africa. Many clinicians rely on the various ACR classification criteria to make a diagnosis of Fibromyalgia despite the unknown performance of these criteria among patients of sub-Saharan African origin.

Objectives: To describe the characteristics of fibromyalgia in Nigerian patients and determine the sensitivities of four ACR criteria sets.

Methods: Consecutive patients diagnosed with fibromyalgia for the first time by a rheumatologist were evaluated using ACR 1990, ACR 2010, 2011 modification of ACR 2010 (ACR 2011) and ACR 2016 classification criteria for fibromyalgia. Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI), fatigue with the Fatigue Severity Scale (FSS) and severity of fibromyalgia with the Revised Fibromyalgia Impact Questionnaire (FIQR). The overall characteristics and the beliefs of these patients regarding their disease were analysed.

Results: Of the one hundred and fourteen (114) patients, ninety six (96) were females; male-to-female ratio is 1:5.3. The median duration of symptoms before diagnosis is 54 months (3 to 273 months) and the mean age is 44.6±15.6 years. Mild, moderate, and severe fibromyalgia were found in 32(28.1%), 53(46.5%) and 29(25.4%) patients respectively. Sensitivities of ACR 1990, ACR 2010, ACR 2011, and ACR 2016 were 38.5%, 68.2%, 76.7% and 76.7%, respectively. Poor sleep was found in 83 (72.8%) patients. Patients in functional classes I, II, and III were 71 (62.3%), 19 (16.7%) and 24 (21.1%), respectively. There was none in class IV. There was positive history of widespread pain in at least one first degree relative of 56 (49.1%) patients. Twenty-one (18.4%) patients had changed or quit their job due to the disease and there was