Prevalence of fibromyalgia in the Israeli population: a population-based study to estimate the prevalence of fibromyalgia in the Israeli population using the London Fibromyalgia Epidemiology Study Screening Questionnaire (LFESSQ)

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ABSTRACT

Fibromyalgia represents the tip of the iceberg of chronic pain in the general population. We have attempted to estimate the prevalence of fibromyalgia in the Israeli population, using the London Fibromyalgia Epidemiology Study Screening Questionnaire (LFESSQ), an instrument previously utilised in several European countries.

Methods. *The LFESSQ-4 screens for widespread pain, and the LFESSQ-6 for widespread pain and chronic fatigue. The LFESSQ was administered via telephone to a sample of 1019 individuals. To estimate the positive predictive value (PPV) of LFESSQ-4 and LFESSQ-6, this questionnaire was submitted to a sample of rheumatology outpatients (n=76), who were examined to confirm or exclude fibromyalgia according to the 1990 criteria. The prevalence of fibromyalgia in the general population was estimated by applying the PPV to community subjects.*

Results. *In the community survey, 5.1% and 3.9% of individuals screened positive for the LFESSQ-4 and LFESSQ-6, respectively. The point prevalence of FMS in the Israeli general population was 2.6% (95%CI 1.7–3.4) when using LFESSQ-4 and 2.0% (95%CI 1.3–2.7) when using the LFESSQ-6 criteria.*

Conclusion. *The prevalence of the fibromyalgia syndrome in the Israeli population is considerable and constitutes a significant health care issue. The prevalence is similar to that observed in other western populations. Based on this tool, over 25% of fibromyalgia cases appear to be among males, a proportion higher than generally appreciated.*

Introduction

Fibromyalgia syndrome (FMS), the prototypical chronic pain condition, is considered to represent a situation in which sensitisation of the central nervous system is clinically manifested by chronic widespread pain and hyperalgesia (1-3). FMS represents the "tip of the iceberg" of chronic musculoskeletal pain, since many individuals in the general population suffer from joint and muscular pain, which is not sufficiently widespread to be defined as FMS (4).

Individuals suffering from FMS may eventually (and appropriately) be referred for rheumatological evaluation and treatment, but many such patients undoubtedly are seen and managed by primary care physicians (5). Hence, it is not easy to estimate the true prevalence of FMS in the general population. Nonetheless, knowing this information is important, both for health care planning and resource allocation, as well as for scientific purposes. Thus, estimation of FMS prevalence may shed light on factors which differentially influence various populations such as ethnic, genetic and environmental parameters.

The concept of FMS has significantly evolved over the past two decades. Since the American College of Rheumatology (ACR) established the original 1990 classification criteria, which were based on the presence of widespread pain and tenderness (6), it has become increasingly appreciated that the clinical spectrum of FMS truly encompasses much more than pain and tenderness alone. Fatigue, sleep disorders, bowel symptoms, difficulty with memory and concentration are but a handful of the broad

spectrum of symptoms which plague FMS patients. Therefore, the ACR has been actively moving forward, first publishing the 2010 diagnostic criteria (7) and subsequently the 2011 revised criteria (8), which have attempted to rectify this situation by including additional symptoms in the diagnosis. It is likely to assume that the prevalence of FMS may be affected by these changes, and that historical figures may need to be updated.

In the current study, we have attempted to estimate the prevalence of FMS in the Israeli population by employing the London Fibromyalgia Epidemiology Study Screening Questionnaire (LFESSQ), a tool which has recently been used for estimating the prevalence of FMS in several European countries (9, 10).

Methods

Phase 1: Screening for widespread pain in the general population

For the purpose of the present study, we adopted a two-stage approach. First, a telephone-based survey was conducted in a sample chosen from the general population of Israel, using the London Fibromyalgia Epidemiology Study Screening Questionnaire (LFESSQ), originally developed by the department of epidemiology and biostatistics of the University of London in Western Ontario, Canada (11). This instrument includes 4 items relating to chronic pain and 2 items relating to fatigue.

The original LFESSQ was translated into Hebrew by one of the authors, fluent in both Hebrew and English (J.N. Ablin), and validated according to standard procedure, including forward translation, quality control and back-translation. In order to ensure full comprehension of the questionnaire by all individuals interviewed, it was further translated into Arabic and Russian.

The study protocol was approved by the medical centre ethics committee.

The questionnaire was administered with the assistance of the B.I. and Lucile Cohen Institute for Public Opinion Research, which is a professional academic public opinion research institute within the Faculty of Social Sciences at Tel Aviv University. The survey in-

cluded a total of 1019 individuals who completed the questionnaire. The sample was chosen as a probabilistic sample of households from statistical areas, chosen according to socio-demographic characteristics of the area. This technique attempts to ensure the representation in the sample of diverse groups, including relatively small subgroups such as ultra-orthodox communities. In this technique, first statistical areas are stratified according to socio-demographic characteristics, *e.g.* geographical area (large *vs*. small cities), number of years in the country (*e.g.* immigrants *vs*. natives), level of religiosity and socio-economic characteristics. The sample is designed in such a way that the probability for each area to be included in the sample is proportional to the size of the population in that area. Subsequently, a sample of households is chosen from each statistical area. The sample was selected from the database of the Israeli telephone company, using landline numbers not listed as commercial. The sample was picked out of this list in random order.

In each household, a single individual was chosen over the age of 18. All data were collected in a computerised call centre, using a computer assisted telephone interview system, with online quality control.

Eligible individuals were administered a Hebrew version of the LFESSQ. Individuals who were identified as native speakers of Arabic or Russian were administered the respective translated versions of the questionnaire. Basic demographic data regarding age, sex, level of education, marital status, income, country of origin (for immigrants) etc. were also collected. A positive screen was defined as either providing a positive response to the 4 pain criteria alone (LFESSQ-4) or giving a positive response to all 4 pain items and to both fatigue items as well (11). The LFESSQ is presented in the Figure 1.

Phase 2: Rheumatology outpatients

In the second phase of the study, the Hebrew version of the LFESSQ was administered to 76 consecutive patients attending the rheumatology clinic at the Tel Aviv Sourasky Medical Centre.

The questionnaires were administered regardless of the cause of visit, but were not administered to individuals attending the specialised fibromyalgia clinic operating at the centre. Demographic data were also recorded. After completing the questionnaires, patients were examined by the research physicians and manual dolorimetry was performed using a standard dolorimetric examination of the ACR 1990 criteria tender points (6). In order to meet these criteria, the patient had to report the presence of pain involving both the right and the left side of the body, both above and below the waist, involving both the axial and the appendicular skeleton, and lasting over three months. The positive predictive value of LFESSQ-4 and LFESSQ-6 were calculated by calculating the number of confirmed (ACR criteria positive) individuals divided by the number of rheumatology patients who screened positive for either LFESSQ-4 or LFESSQ-6, respectively (12).

Statistical analysis

Statistical analysis was performed using the SPSS software version 17.0. A two-sided analysis was performed and the level of significance was set at 5%. The χ^2 test was used for qualitative data and the analysis of variance (ANOVA) for quantitative data.

Results

A total of 1.019 individuals completed the telephone-based study questionnaire, representing 30% of the individuals contacted: 77.7% of the interviews were conducted in Hebrew, 15.1% in Arabic and 7.2% in Russian.

Of these, 500 (49.1%) were male and 519 (50.9%) female. The average age was 49.7 (range 18–98, SD 18.2).

The age distribution of individuals completing the questionnaire is presented in Table I.

In the community survey, 5.1% and 3.9% of individuals who responded to the questionnaire screened positive for LFESSQ-4 and LFESSQ-6, respectively. Among males interviewed, 3.0% and 2.2% screened positive for LFESSQ-4 and LFESSQ-6, respectively, while among females 7.1% and 5.6% screened

Table I. Age distribution of individuals completing the telephone survey.

Age group	Frequency	Percent
18–22	70	6.9
23–29	79	7.8
30–39	186	18.3
40–49	163	16.0
50–59	175	17.2
60–69	158	15.5
70+	182	17.9
Total	1013	100

Table II. Prevalence of positive LFSSQ4 and LFSSQ6 screens by gender.

	LFSSQ4	LFSSQ6
Male	15/500 (3%)	11/500 (2.2%)
Female	37/519 (7.1%)	29/519 (5.6%)
Total	52/1019 (5.1%)	40/1019 (3.9%)

Fig. 1.   London Fibromyalgia Epidemiology Study Screening Questionnaire

Pain criteria
In the past three months
1. Have you had pain in muscles, bones or joints, lasting at least one week?

2. Have you had pain in your shoulders, arms or hands? On which side?
  Right, left or both?

3. Have you had pain in your legs or feet? On which side? Right, left or both?

4. Have you had pain in your neck, chest or back?

Meeting the pain criteria requires "yes" responses to all four pain items, and either (1) both a right and left side positive response, or (2) a both sides positive response.

Fatigue criteria
5. Over the past three months, do you often felt tired or fatigued?

6. Does tiredness or fatigue significantly limit your activities?

Screening positive for chronic, debilitating fatigue requires a "yes" response to both fatigue items

K.P. WHITE, M. HARTH, M. SPEECHLEY *et al.*: Testing an instrument to screen for fibromyalgia syndrome in general population studies: the London Fibromyalgia Epidemiology Study Screening Questionnaire, *J Rheumatol* 1999; 26: 880-4.
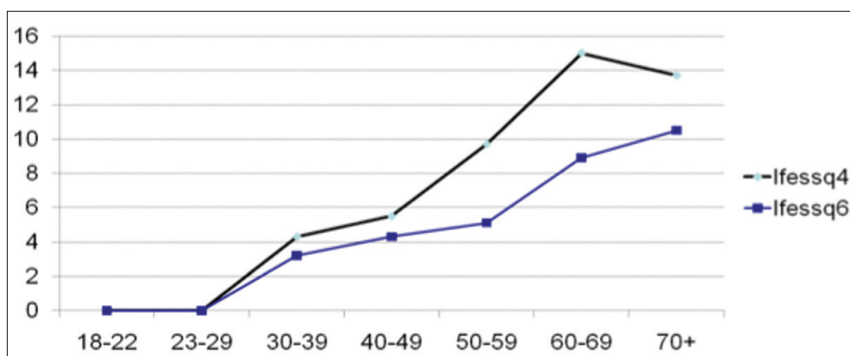
Fig. 2. Percentage of LFESSQ4 (pain) and LFESSQ6 (pain and fatigue) positive individuals in the population survey by age group.

positive for LFESSQ-4 and LFESSQ-6, respectively.

As shown in Figure 2, widespread pain tended to increase in prevalence with increasing age. Figure 2 presents the age dependency of positive screens for LFESSQ4 and LFESSQ6.

Among rheumatology outpatients, 41.5% screened positive for LFESSQ-4 and 33.8% screened positive for LFESSQ-6. Twenty-one point five percent were confirmed FMS cases, fulfilling the ACR 1990 classification criteria. Fifty percent of LFESSQ-4 positive patients and 50% of LFESSQ-6 positive patients were ACR-criteria positive for FMS, so the positive predictive value (PPV) for both tests was identical, at 50%. Based on this value, the point prevalence of FMS in the Israeli general population was 2.6% (95%CI 1.7–3.4) when using LFESSQ-4 and 2.0% (95%CI 1.3–2.7) when using the LFESSQ-6 criteria. In females, the calculated point prevalence was 3.6% (95%CI 2.4–4.7) when using LFESSQ-4 and 2.8% (95%CI 1.8–3.8) when using LFESSQ-6. Among males, the point prevalence of FMS was 1.5% (95%CI 1.0–2.0) using LFESSQ-4 and 1.1% (95%CI 0.7–1.5) when using the LFESSQ-6 criteria.

Fifty-six percent of individuals screened in the population reported fatigue over the last three months, while 35.5% reported that their activities had been restricted due to fatigue over the same period. Twenty-eight percent reported suffering from sleep disorders, and 8.6% reported regular use of sleep medications. In comparison, 15.2% reported the regular use of medications against pain. Thirty-four point one percent of individuals interviewed reported suffering from musculoskeletal pain over the last three months. Notably, the question was not restricted to the presence of chronic pain lasting over three months, rather to any report of pain during that period. On a scale of 1 to 10, 1 representing complete dissatisfaction with the effect of medications against pain and 10 representing complete satisfaction, the mean level of satisfaction of individuals who were being treated on a regular basis with such medication was 6.6 (SD -2.4).

Table II presents the prevalence of individuals who screened positive on LFSSQ4 and LFSSQ6 according to gender.

Discussion

The current study is the first attempt to document specifically the prevalence of reported widespread pain and fatigue, consistent with the FMS, in the Israeli population. Buskila *et al.* previously studied the prevalence of chronic pain, including chronic widespread pain, in the Israeli population (13). In their study, 9.9% of the population was estimated to suffer from chronic widespread pain, comparable to the prevalence in major western countries. Similar rates have been found by Ablin *et al.* in a recent study carried out on two Israeli towns (14). In the current study, however, we have made a more specific endeavor to estimate the prevalence of FMS, not chronic pain *per se*, in the Israeli population. Thus, implementation of the LFESSQ was intended to achieve more precise information regarding FMS, by incorporating the estimation of concomitant widespread pain and fatigue (LFESSQ6). Previous estimation of the prevalence of FMS *versus* chronic widespread pain conducted using different methodologies reached widely varying results (15, 16).

The prevalence of the FMS in the Israeli population is considerable, as estimated by the use of the LFESSQ, and constitutes a significant health care issue. This prevalence is somewhat higher than the prevalence recently estimated in France (1.6%) (17), but is in line with results found in population studies conducted in Europe, *e.g.* 2.4% in Spain (18) and 4.7% in a European study using similar methodology to ours (9). Similar results were previously reported in the USA as well, using a different methodology (19). Focusing on another aspect of the FMS prevalence topic, Haviland *et al.* have shown a steady increase in the number of patients carrying a diagnosis of FMS admitted to hospitalisation in the USA (20)

Using the LFESSQ-4 and the LFESSQ-6 yields similar results, but the LEFSSQ-6 would appear to be more accurate, since it incorporates the symptom of fatigue, which is an important clinical characteristic of FMS. Based on this tool, possibly over 25% of FMS cases appear to be among males in the small sample population (n=7), a higher proportion than generally appreciated (21). This is in line with the general perception that omitting the requirement for tender point examination may increase the proportion of male FMS patients identified, thus allowing for a more accurate management of these individuals.

Over and above the estimation of FMS prevalence, the current study has supplied useful data regarding such symptoms as fatigue, sleep disturbances, and use of medications related to sleep and pain in the Israeli general population. Sleep problems are highly prevalent among FMS patients (22) and a in a recent study (the Norwegian HUNT study) a strong dose-response association was demonstrated between sleep problems and the prospective risk of FMS (23). Our results demonstrated a relatively high prevalence of sleep problems, fatigue and use of sleep-medications in the general population, as well as a high prevalence of individuals who report they have significantly limited their activity due to fatigue. These results call attention to the importance of recognising sleep disorders and fatigue as an important health issue with implications regarding quality of life and resource allocation.

Another point to mention regards the relatively high proportion of individuals reporting lack of satisfaction from their pain-medications. Despite the focused attention granted to pain management over the last decade (24), pain continues to pose an unmet need and requires continuing efforts to be controlled.

In the current study, the Positive Predictive Value (PPV) of both versions of the LFESSQ was high (50%). This is similar to the results reported in the original study by White *et al.* (11) (56.8–70.6%), but higher than that found in the study conducted by Bannwarth *et al.* in France (22.6–27.4%) (9). Hence, it is obvious that while the LEFSSQ method achieves useful data regarding the prevalence of pain and fatigue in the general population, the actual prevalence estimation of FMS reached is strongly influenced by the calculated PPV in the particular population studied.

Our study has several limitations. The PPV of both versions of the LFESSQ was only evaluated in a small sample of patients suffering from rheumatic diseases. Although we believe that the PPV achieved in this group of patients is representative, we did not confirm it in the general population or other groups of patients with non-rheumatic disease. Likewise, as pointed out by Bannwarth *et al.* ideally, a representative sample of individuals identified by the population survey should be invited to come in and undergo physical examination in order to verify or rule out a diagnosis of FMS, in line with the strategy used by Wolfe *et al.* (18). This, however, may result in potential bias, since those individuals who would consent to such an examination may well be those suffering from excess symptoms of FMS.

Conclusion

The current study has demonstrated an estimated prevalence of widespread pain and fatigue, consistent with FMS, in the Israeli population of 2.0–2.6%, using LFESSQ4 and LFESSQ6, respectively. This would translate into 150.000–190.000 FMS cases in the general population. FMS thus poses a major health issue in Israel, similar to other countries studied.

Significance and Innovation

- Estimating the population prevalence of fibromyalgia is challenging due to the syndrome often being mis-diagnosed or managed at the primary care level.
- The London Fibromyalgia Epidemiology Study Screening Questionnaire allows estimation of Fibromyalgia in the general population and distinguishes between pain and fatigue criteria.
- By using this tool, the current study demonstrates the significant prevalence of fibromyalgia in the Israeli population as well as a high proportion of males involved.
- This finding is in line with the expectation, that eliminating the tender point criterion for fibromyalgia diagnosis will increase the proportion of males diagnosed and treated for this condition.

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