

Proportion and Determinants of Fibromyalgia in a Sample of Egyptians with Higher Education (Physicians and Non-physicians): A Comparative Cross-sectional Study

Original Article

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ABSTRACT

Background: Fibromyalgia (FM) is a disease of widespread bodily musculoskeletal pains which negatively impacts an individual's job performance. The healthcare service is a stressful profession, entailing longer working hours than other professions and requiring considerable physical and mental stamina. This study aimed to explore demographic (sex, age) and work-related (profession, workday length) predictors of FM in a sample of Egyptian adults with higher education.

Methods: Age and sex matched Egyptian physicians (PH) and non-physicians (NP) with non-medical higher education degrees, were screened for FM using FM Rapid Screening Tool. Sex, age group, profession (PH or NP) and workday length (short, standard, or extended) were collected. Logistic regression was used to explore predictors of FM.

Results: A total of 426 participants were recruited (212 PH and 214 NP). FM was observed in 11.8% of PH and 16.4% of NP ($p=0.176$). PH worked longer hours than NP ($p<0.001$) even in the presence of FM ($p<0.001$). Female sex (Odds ratio (OR) 2.63, 95% confidence interval (CI) 1.24-2.58, $p=0.012$), age ≥ 40 years (OR 3.13, 95% CI 1.61-6.09, $p<0.001$) predicted FM presence, while participant profession (PH vs NP) and different workday lengths did not.

Conclusions: The frequency of FM did not significantly differ between PH and NP. Traditional demographic variables predicted FM in this cohort, while work related ones did not. Larger studies are required to elucidate the relationship between work related variables such as occupational stress and burnout and the development of FM among Egyptians with higher education.

Key Words: Egyptian, fibromyalgia, FiRST, physicians.

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INTRODUCTION

Fibromyalgia (FM) is a common cause of musculoskeletal pain. It is a non-inflammatory, non-immune mediated disorder of central pain processing. Its hallmark features are widespread pain in the form of hyperalgesia, allodynia, non-restorative sleep, cognitive dysfunction, along with an array of somatic symptoms^[1, 2], all of which negatively impact an individual's job performance, overall productivity, and quality of life^[3, 4]. It predominantly affects females^[5, 6], and an increased risk for developing FM is observed in the middle age^[6, 7].

FM is a stress-related disorder, in which hypothalamic-pituitary-adrenal axis alterations have been documented^[8, 9]. PH are under tremendous stress today, having to be regularly exposed to human suffering and having little room for error with potentially grave consequences^[10]. They work longer hours in comparison to doctoral-level professionals in non-medical fields and are more likely to experience dissatisfaction with their careers and work-life balance and to suffer burnout in comparison to their non-physician (NP) peers^[10, 11].

FM is detrimental to the physical and social functioning of affected individuals affecting their work performance^[3, 12]. An interaction between vocational demands and the overall physical and mental health status of patients with FM understandably culminates in work disability^[13, 14]. Research into FM in relation to occupation is relevant because in a mentally and physically demanding profession such as practicing medicine, the impact of FM is likely to result in negative patient outcomes.

Worldwide, the prevalence of FM in the general population ranges between 0.2 and up to 8%^[8], while the pooled regional prevalence of FM in the Eastern Mediterranean region is 4.43%^[9]. A Saudi Arabian study investigating FM in healthcare workers estimated the prevalence of FM in physicians (PH) to be 11.6%^[10]. FM Rapid Screening Tool (FiRST) is a validated, sensitive, and specific self-report questionnaire designed to screen adults for FM and has been adapted to the Arabic language^[11, 12]. Studies on FM in Egyptian PH are scarce. Thus, the aim of this pilot study was to explore whether employment as a PH and workday length were predictors of the occurrence of FM among Egyptian adults with a higher education.

PATIENTS AND METHODS

This comparative cross-sectional study recruited Egyptian PH and NP through social media platforms to participate by filling out an anonymous online survey. To be eligible for inclusion in the study, a PH had to have received their Medical Practice License from the Egyptian Medical Syndicate. Thus, undergraduate medical students, trainees who have not yet completed their internship, and non-physician (NP) healthcare workers (e.g., nurses) were excluded. Inclusion criteria for NP were being an Egyptian with an academic degree from a university or institute of higher education in a field outside medicine. Non-Egyptian permanent residents and individuals without higher education were excluded. This study was performed in accordance with the 1964 Declaration of Helsinki and its later amendments. All participants gave their informed consent prior to their inclusion.

The online survey collected data including sex, age group, and employment status. Employed participants were questioned about their typical workday length in hours (h/d). Participants were subdivided into 3 categories

according to their typical workday length: short workday (< 6 h/d), standard workday (6-12 h/d), and extended workday (≥ 13 h/d).

Participants were questioned about any chronic medical or psychiatric illness that required pharmacologic or non-pharmacologic therapy for the past 3 months. Any participant suffering from any chronic illness was excluded.

The Egyptian version of FiRST was employed to screen participants for FM^[15]; it included six questions, each assigned one point, to assess the characteristics of pain experienced, its location, character, associated symptoms, and the effect on the quality of life if any. Any participant with a score of $\geq 5/6$ points was considered to have FM.

Statistical Analysis: Assuming a confidence level of 95%, a 5% margin of error and a population proportion of 11.6%^[16], at least 158 responses had to be collected. Assuming a drop-out rate of 20%, for the final sample size, at least 190 responses had to be collected in each group. Survey responses were exported into Microsoft Excel 365. SPSS 22 was used for statistical analysis (IBM Corp, Armonk, NJ). Frequencies were used to describe qualitative data. Bivariate relationships were displayed in cross tabulations and comparison of proportions was performed using the Chi-square test or Fisher exact tests (with post-hoc Bonferroni-Holm *p value* corrections) when appropriate. Logistic Regression analysis was performed to identify potential predictors of FM among the cohort of participants. Statistical significance was considered if the *p value* was <0.05.

RESULTS

A total of 426 participants were recruited (212 PH and 214 NP). A summary of their demographic characteristics and workday lengths is presented in (Table 1). As for the FiRST score, FM was less frequent in PH than in NP (11.8% vs. 16.4%), though the difference didn't reach statistical significance ($p=0.176$). Notably, only the FiRST question concerning the impact of pain on the quality of life had significantly more positive responses in the NP than in the PH group, regardless of the presence of FM (38.8% vs. 23.1%, $p<0.001$). Examining PH and NP together as a cohort of Egyptians with higher education, FM was observed in 60(14%) subjects.

Table 1: Comparison of Characteristics of the Physician versus Non-physician groups of participants.

Parameters		PH (N=212)		NP (N=214)		P value
		N	%	N	%	
Sex	Male	56	26.4	67	31.3	0.265
	Female	156	73.6	147	68.7	
Age Group (years)	20-39	176	83.2	178	83.2	0.965
	≥40	36	17.0	36	16.8	
Workday Length	Unemployed	21	9.9	22	10.3	1.000
	Short	40	18.9	88	41.1	
	Standard	139	65.6	56	26.2	
	Extended	12	5.7	48	22.4	
Fibromyalgia Present		25	11.8	35	16.4	0.176

Bold values are statistically significant. NP: non-physicians; PH: physicians.

FM was consistently more frequent in females than males, yet without differences achieving statistical significance. Considering the entire cohort of participants regardless of profession, FM was more frequent in females compared to males (15.8% vs. 9.8%, $p=0.124$). FM was more frequent in female PH than in their male peers (14.1% vs. 5.36%, $p=0.094$) and in female NP than in their male peers (17.69% vs. 13.43%, $p=0.435$). A comparison of demographic and work-related characteristics of participants with and without FM is outlined in (Table 2).

Table 2: Comparison between participants with and without fibromyalgia.

Parameters		FM (N=60)		No FM (N=366)		P value
		N	%	N	%	
Sex	Male	12	9.8	111	90.2	0.102
	Female	48	15.8	255	84.2	
Age Group (years)	20-39	42	11.9	312	88	0.003
	≥40	18	88.1	54	14.8	
Profession	Physician	25	11.8	187	88.2	0.176
	Non-physician	35	16.4	179	83.6	
	Unemployed	6	10.0	37	10.1	
	Short	15	25.0	113	30.9	
Workday Length	Standard	27	45.0	168	45.9	0.505
	Extended	12	20.0	48	13.1	

Bold values are statistically significant. FM fibromyalgia.

Regarding workday length, the proportion of participants working $\geq 8/d$ was significantly higher in PH than in NP (71.2% vs. 48.6, $p<0.001$). Comparing participants according to their FM status, the proportion of PH with FM working $\geq 8/d$ was significantly higher than in NP with FM (84.0% vs. 51.4%, $p=0.019$). Similarly, the proportion of PH without FM working $\geq 8/d$ was significantly higher than in NP with FM NP (69.5% vs. 48.9%, $p<0.001$). Within each professional group, the proportions of participants with different workday lengths were comparable among PH with and without FM ($p=0.273$) as well as among NP with and without FM ($p=0.721$).

Logistic regression analyses for demographic (sex, age group) and work related (profession, workday length) predictors of FM in the entire sample of participants are displayed in (Table 3).

Table 3: Logistic regression analyses for possible predictors of fibromyalgia among study participants.

Univariate Analysis			95% Confidence Interval		
Predictor	B	P	Odds ratio	Lower	Upper
Female Sex	0.55	0.105	1.7	0.89	3.41
Age ≥40 years	0.907	<0.001	2.47	1.32	4.61
Profession a	0.28	0.178	0.68	0.39	1.18
Workday Length b					
Unemployed	0.00	0.980	1.01	0.38	2.62
Short	-0.19	0.579	0.82	0.42	1.62
Extended	0.44	0.249	1.55	0.73	3.29
Multivariate analysis			95% Confidence Interval		
Predictor	B	P	Odds ratio	Lower	Upper
Female Sex	0.96	0.012	2.63	1.24	5.58
Age ≥40 years	1.14	<0.001	3.13	1.61	6.09
Profession a	-0.55	0.099	0.57	0.29	1.11
Workday Length b					
Unemployed	-0.54	0.311	0.58	0.20	1.66
Short	-0.59	0.129	0.55	0.25	1.19
Extended	-0.03	0.934	0.94	0.96	2.36

Bold values are statistically significant; a: non-physicians are used as a reference level; b: standard workdays used as reference level.

DISCUSSION

Work related stress has been implicated as a contributor to the development and exacerbation of FM symptoms^[9]. The presence of pain, cognitive dysfunction, chronic and often disabling fatigue, increased need for rest, and somatic symptoms in individuals suffering from FM negatively impacts their ability to function in both the social and professional facets of their lives^[3, 4, 12]. Research on FM in a highly demanding and stressful profession such as medicine is essential because PH with FM are likely to have experience work disability^[13], which would lead to unsatisfactory performance and unacceptable patient outcomes. Thus, the aim of this pilot study was to explore whether employment as a PH and individual workday length would predict the presence of FM in a cohort of Egyptians with higher education.

In the current work, FM was observed in 11.8% of PH. A recent study has explored the prevalence of FM among different healthcare workers, where the prevalence of FM in PH was 11.6%^[16], which is comparable to the findings in this study. An earlier Saudi study has investigated the prevalence of FM using FiRST in PH in training and found it to be 6.0%. A lower prevalence of FM among both female and male Saudi Arabian PH in training (11.5% and 1.9% respectively) compared to female and male PH in this study (14.1 and 5.36% respectively) was also documented. The difference in results from *Omair et al.*, may be explained by their inclusion of a relatively homogenous, predominantly male cohort of residents and fellows in

their late twenties^[17], in contrast to the older age groups and a greater proportion of females recruited in this study. In a Pakistani study, the prevalence of FM among PH was 28.4%^[18], which may be explained by the unusually high prevalence of rheumatoid arthritis (69%) among the included Pakistani PH.

In this work, FM in PH (11.8%) was numerically, though non-significantly, less frequent than in NP (16.4%), despite working hours per day being higher in PH compared to NP, regardless of the FM status. Additionally, participant profession failed to predict the presence of FM among included participants. A recent study documented higher levels of resilience in physicians than in the general working population, owing to the arduous and extended training experience unique to medicine rather than other professions. Resilient individuals are more adaptive under stress and tend to “thrive in the face of adversity”^[19]. Further studies are needed to explore whether PH specific psychological factors such as resilience could explain the observed lack of a higher prevalence of FM in PH despite their stressful work environment and longer working hours than their NP peers.

Workday length was not a significant predictor of FM in this cohort of Egyptians with higher education either. Within each professional group in this study, there was no statistically significant difference between PH with and without FM, nor between NP with or without FM in terms of workday length. Categorizing participants from both

professional groups according to their FM status regardless of their profession, there was no significant difference in working hours between subjects with or without FM either. In accommodation of their reduced capacity for working normal hours, FM patients have been documented to reduce their working hours^[20, 21]. Such phenomenon has not been replicated in this study, in which FM individuals from both the PH and NP groups worked comparable hours to their non-FM peers. In Egypt, FM is not legally recognized as a disabling health condition^[22], thus FM employees in the public or private sectors are not eligible for working hour reduction with full pay. Thus, it is not inconceivable that the economic crisis in Egypt has turned reduction in working hours for FM employees into an “unaffordable luxury”.

As for sociodemographic predictors of FM in this study, being female was a predictor for the presence of FM in this cohort. This is consistent with abundant evidence from epidemiologic studies that demonstrates that women are at substantially greater risk for many clinical pain conditions, including FM^[5, 6, 23]. Sex steroids alter levels of neuromodulators involved in spinal nociceptive processing, including substance P, amino acids such as gamma aminobutyric acid, and have been shown to increase the number of excitatory synapses in neurons in the cortex, cerebellum, and hippocampus^[24]. This could explain why females with FM also tend to have greater disease severity scores and symptomatology^[5].

In this work, participant age ≥ 40 years was also a significant predictor of FM. This is in line with epidemiologic studies which have documented advancing age to be significantly associated with FM^[6, 7, 25]. In women, the prevalence of FM is only 0.9% between the ages of 18 and 30 years but increases sharply at the age of 40–60 years, a period known for hormonal changes in women^[7]. Contrary to these findings, in a study examining the prevalence of FM among doctors in a tertiary care hospital in Pakistan, FM was not significantly associated with age, yet the prevalence showed a decreasing trend with advancing age^[18].

While, to the best of our knowledge, this study is the first study to evaluate employment as a PH and workday length as possible predictors of FM among Egyptians with higher education, it is not without limitations. These include its cross-sectional design, the relatively small sample size, as well as the relatively smaller proportion of male versus female participants. Occupational stress and burnout were not formally assessed or compared between the PH and NP groups as well. Larger research projects aiming to explore specific predictors of FM in PH, including specialty,

working hours, type of medical practice and the presence of comorbidities should be on the research agenda.

In summary, the frequency of FM in Egyptian PH did not significantly differ from their peers from professions outside medicine, and in both groups, it was higher than the pooled prevalence of FM in Middle Eastern adults. Egyptian PH consistently had longer working hours than NP, even in the presence of FM. Age ≥ 40 years and female sex were predictors of FM in Egyptians with higher education, while employment as a PH and workday length were not. Further large-scale studies are needed to confirm these findings, longitudinally exploring the impact of occupational stress on the development of FM. Once identified, individuals with FM should be offered the education and support they need to adjust their working conditions, regarding both their working hours and occupational demands, to be more in line with their physical capacity^[26, 27]. Such patient education improves coping, self-efficacy, patient health related quality of life, and reduces unnecessary healthcare associated costs^[28, 29].

LIST OF ABBREVIATIONS

FiRST: Fibromyalgia Rapid Screening Tool

FM: fibromyalgia

NP: non-physician

PH: physician

DECLARATIONS

Redundant or duplicate publication:

The authors confirm this paper has not been published in its current form or substantially similar form elsewhere including on a website and has not been accepted for publication elsewhere.

Ethics Approval and Consent to Participate

This study was approved by Cairo University Faculty of Medicine Research Ethical Committee (Code N-229-2023) and has thus been conducted in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. All participants have provided informed consent prior to their inclusion.

Consent for Publication

Not Applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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AUTHORS' CONTRIBUTIONS

BE and DA conceptualized the research project and BE prepared the data collection survey. DA, AI and AD oversaw participant recruitment and data collection. AS and EE performed data handling and analysis. AA wrote the first draft of the manuscript. BE revised the draft for publication. All authors have read and approved the final manuscript.

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نسبة وعوامل تحديد الفيبروميالجيا في عينة من المصريين ذوي التعليم العالي (الأطباء وغير الأطباء): دراسة مقارنة عرضية

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الخلفية: تعد الفيبروميالجيا مرضًا يتسبب في آلام عضلية وجسدية منتشرة على نطاق الجسم تؤثر سلبيًا على أداء الفرد في العمل. يعتبر تقديم الرعاية الصحية مهنة مجهدة، حيث تتطلب ساعات عمل أطول من المهن الأخرى وتتطلب قدرًا كبيرًا من القوة البدنية والعقلية.

الهدف: استكشاف عوامل التوقع الديموغرافية (الجنس، السن) والمتعلقة بالعمل (المهنة، طول يوم العمل) للإصابة بالفيبروميالجيا في عينة من البالغين المصريين ذوي التعليم العالي.

الأساليب: تم فحص الأطباء المصريين وغير الأطباء الحاصلين على شهادات تعليم عالية غير طبية (متطابق العمر والجنس) للتحقق من وجود الفيبروميالجيا باستخدام أداة الفحص السريعة للفيبروميالجيا FIRST. تم جمع البيانات المتعلقة بالجنس، وفئة العمر، والمهنة (طبيب أو غير طبيب)، وطول يوم العمل (قصير أو قياسي أو ممتد). تم استخدام التحليل اللوجستي لاستكشاف عوامل التوقع للفيبروميالجيا.

النتائج: انضم ما مجموعه ٤٢٦ مشاركًا (٢١٢ من الأطباء و ٢١٤ من غير الأطباء). لوحظت الفيبروميالجيا في ١١,٨٪ من الأطباء و ١٦,٤٪ من غير الأطباء. ($p=0,176$) عمل الأطباء ساعات أطول من غير الأطباء حتى في وجود الفيبروميالجيا ($p>0,001$). تنبأ بوجود الفيبروميالجيا الجنس الأنثوي (نسبة الأرجحية ٢,٦٣، فاصل الثقة ١,٢٤-٢,٥٨، $p=0,012$) كما تنبأ بها كون السن ٤٠ سنة أو أكثر (نسبة الأرجحية ٣,٣١، فاصل الثقة ١,٦١-٦,٠٩، $p>0,001$) بينما لم تنبأ بها مهنة المشارك (طبيب مقابل غير طبيب) و لا أطوال يوم العمل المختلفة.

الاستنتاجات: لم يختلف انتشار الفيبروميالجيا بشكل ملحوظ بين الأطباء وغير الأطباء. تنبأت المتغيرات الديموغرافية التقليدية بوجود الفيبروميالجيا في هذه العينة، بينما لم تنبأ بوجودها المتغيرات المتعلقة بالعمل. تلزم دراسات أكبر لتوضيح العلاقة بين المتغيرات المتعلقة بالعمل مثل الضغط الوظيفي والإحراق وحدوث الفيبروميالجيا بين المصريين ذوي التعليم العالي.