

# Prevalence of Musculoskeletal Disorders in Farmer Workers in Outpatient Physiotherapy Department: An Epidemiological Study

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**Abstract-** Musculoskeletal disorders (MSD) involve inflammatory and degenerative diseases that lead to pain and functional damage in all age groups. The agricultural profession is painful with many natural hazards/risks and stressful factors that either predispose or cause injuries to the musculoskeletal system. The aim of this current study is to determine the prevalence of the musculoskeletal burden on farmers who sought physical therapies, in a public, general hospital of Northern Greece.

An epidemiological study was conducted during the period January 2008 – December 2014, through a retrospective study of the patients' records. The distribution of the MSDs was carried out according to Nordic Body Map. 1,020 patients' files were studied. The agricultural farmers held the highest percentage (58.8%) of the total population. Female farmers occupy the highest percentage of MSDs in the knee joint (30.26%), while men in the shoulders (41.0%).

The results of the survey highlighted the increased emergence of MSDs in agricultural workers. Educating farmers and using improved farming equipment can help prevent musculoskeletal risks and improve musculoskeletal health.

**Index Terms-** farmers, agricultural, musculoskeletal disorders, injuries

## I. INTRODUCTION

The musculoskeletal disorders (MSD) concern acute and chronic syndromes, inflammatory and degenerative diseases that lead to pain and functional damage and cause symptoms to the musculoskeletal system in all age groups (Caboer, 2000). The primary symptom of MSDs is pain, usually accompanied by stiffness, swelling and reduced functionality of the ailing area (Woolf and Akesson, 2007). The musculoskeletal pain, as a subjective symptom, is distinguished in primary (local and specific area), secondary (pain that extends and reflects even in areas distant from the damage area) and tertiary (psycho – physical traits and diffused pain) (Coderre et al., 1993).

Various causative factors, mainly social, psychological and professional have been identified as risk factors for the emergence of many MSDs. The prevalence of MSDs in the general population is undoubtedly high, while the percentages vary according to the methodology of each study (Coderre et al., 1993). The disorders

of the musculoskeletal system are prevalent into societies all over the world and their impact is diffuse (Allison et al., 2002). It is the most common cause of persistent, long –term pain, affecting millions of people of all occupations, including health professionals, office workers and handworkers (Garima and Tarique, 2013; Bihari et al., 2011; Ghasemkhani et al., 2008;). MSDs are responsible for diseases, deterioration in the quality of life and reduction in productivity (Niu, 2010). According to the International Labor Organization, the work related musculoskeletal diseases play a crucial role in terms of occupational health and the economy (Kar and Dhara, 2007).

One of the professional activities associated with the existence of risks for imminent injuries of the musculoskeletal system, is agriculture, which is considered to be one of the most unsafe sectors, both in developed and developing countries (Niu, 2010; Walker-Bone and Palmer, 2002). The agricultural profession, although often presented as idyllic, is painful with many natural dangers and stressful factors that predispose or even cause injuries to the musculoskeletal system (Bernard and Tourne, 2007). Studies addressed to agricultural population have highlighted the impact of farming as a risk factor for frequent and painful musculoskeletal syndromes, alongside other health problems (Hong Xiao et al., 2013; Holmberg, 2005). The main purpose of the current study is to determine the prevalence of musculoskeletal burden to farmers who sought physiotherapy services in outpatient physiotherapy department of a public general hospital in a Rural Region of Northern Greece.

## II. METHODOLOGY

The total amount of the patients' records (n=1,020) to whom outpatient physiotherapy services were provided in a public, general hospital of Northern Greece during 2017 – 2018, were studied retrospectively. Ethical and deontology issues were taken into great consideration, as for the collection of the data and the conduct of the research, the required permission by the Personal Data Protection Authority was ensured.

The entire population, the size of the rural population on the basis of the reported insurance institution, the gender, the type of MSDs, the number of the congresses and the seasonal distribution were recorded from the files. Cases of patients with health problems except for MSDs (vascular strokes, chronic

obstructive pulmonary disease and others), who were double registered, aged < 18 and with incomplete recording data were excluded from the study.

For the distribution of MSDs per physical area, the technique of Nordic Body Map, was used, specifying nine (Bihari et al., 2011) physical areas: neck, shoulders, elbows, arms, spine, loins, hips, knees and ankle joints.

### III. RESULTS AND DISCUSSION

According to the results of the study, the highest percentage of the patients were farmers (58.8%), while a small percentage 2.2% concerned people without a profession and insurance coverage and other cases (Table 1).

**Table 1: Distribution of the population per occupational status**

| Occupation        | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Farmers           | 600           | 58.8           |
| Private employees | 171           | 16.8           |
| Public servant    | 144           | 14.1           |
| Self-employed     | 85            | 8.3            |
| Other             | 20            | 2.2            |
| Total             | 1.020         | 100            |

In terms of the gender of the rural population with MSDs, a heterogeneous distribution was observed. Women held a percentage of 71.0%, while men 29.0%. (Table 2).

**Table: 2. Distribution of rural population with MSDs in terms of gender**

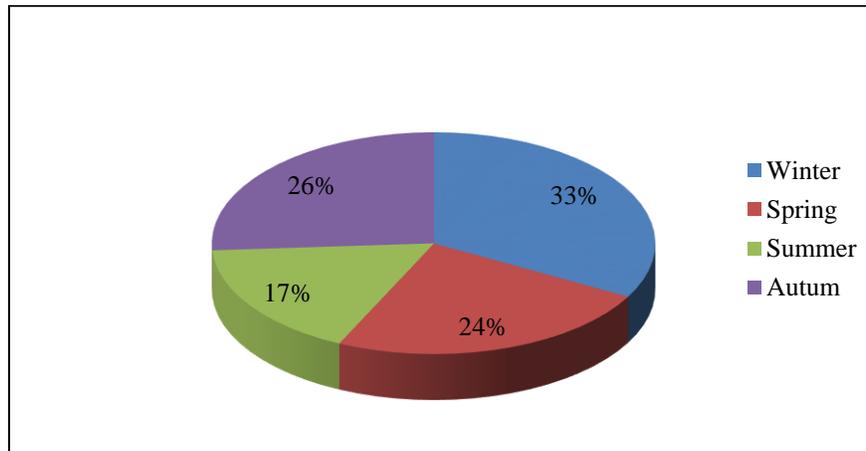
| Gender | Frequency (n) | Percentage (%) |
|--------|---------------|----------------|
| Male   | 175           | 29.0           |
| Female | 425           | 71.0           |
| total  | 600           | 100            |

The percentage ratio of MSDs shows deviations that are shown in table 3. Specifically, men show a higher percentage of MSDs in the shoulders (41.0%), while women in the knees (30.1%). The lower MSD rate in both genders concerns the ankle joint (male: 1.8%, female: 1.9%).

**Table: 3. Prevalence of MSDs per anatomical area and gender**

| Anatomical area | Male          |                | Female        |                |
|-----------------|---------------|----------------|---------------|----------------|
|                 | Frequency (n) | Percentage (%) | Frequency (n) | Percentage (%) |
| Neck            | 13            | 7.5            | 46            | 10.8           |
| Shoulders       | 72            | 41.0           | 23            | 5.4            |
| Elbows          | 14            | 8.0            | 48            | 11.3           |
| Wrist/Hands     | 46            | 26.0           | 53            | 12.5           |
| Upper Back      | 8             | 4.5            | 47            | 11.0           |
| Lower Back      | 8             | 4.5            | 58            | 13.7           |
| Hips            | 6             | 3.4            | 14            | 3.3            |
| Knees           | 5             | 2.8            | 128           | 30.1           |
| Ankles/Feet     | 3             | 1.8            | 8             | 1.9            |
| Total           | 175           | 100            | 425           | 100            |

As far the seasonal distribution of the request for treatment of the MSDs is concerned, the following seasonal distribution was observed: winter (33%), autumn (26%), spring (24%) summer (17%) (graph. 1)



**Graph 1. Seasonal distribution of MSDs**

In this specific survey, it was found that the highest percentage of people with reported MSDs were people who dealt with agricultural work. Agriculture is generally regarded, both by farmers and general public, as a healthy profession that promotes physical activity (Hong Xiao et al., 2013). However, the reality is that due to the nature of the agricultural work, farmers and those who work in farms are at greater risk of developing MSDs (Nyfoudi, 2012; Pickett et al., 2001) like cervical syndrome, tendinitis and tenosynovitis carpal tunnel syndrome (Kirkhorn et al., 2003; Jagga et al., 2011), hip and knee disability and osteoarthritis (Bernard and Tourne, 2007), sciatica and low back pain (Kirkhorn, 2010), sprains and muscle's strains, dislocations and fractures accompanied with soft tissues lesions (Kolstrup, 2012).

Examples of some natural hazards that farmers are facing during their labor are the lifting and transport of loads (Allison et al, 2002), the adoption of awkward and hazardous body and working postures (Bartels et al., 2000), the falls from height or due to slippery surfaces, the exposure to vibrations from the use of agricultural vehicles and the use of motorized hand tools (Paoli and Merllie, 2001; Nonnenmann et al., 2010).

The rural population of this research area deals primarily with the intensive cultivation, having as a primitive cultivation the trees, a situation that forces the farmers to be exposed to vibrations from the long use of agricultural vehicles and especially the tractors. Also, the excessive bending of the trunks and the transport of loads make the lump prone to injuries of the intervertebral discs and subsequent back pain. Essentially, these are works that act as a source of biochemical loading in the musculoskeletal system, while these external loads are caused by the body position during work.

In this specific research, from the data analysis, a higher frequency of MSDs was shown to women and it was also reported by other researchers, too (Das, 2015; Menon and Seshadri, 2004). Female farmers participate in all farming activities (Singh and Arora, 2010) (sowing, watering, harvesting, packaging, and storing), playing a significant role in in the agricultural development (Hurst, 2007). It is more possible to suffer from MSDs with chronic pain, due to their smaller body size and muscular strength, compared to men (Marras et al., 2002), a fact

that constitutes their muscular system weaker to bear relative loads in comparison with the men (Suthar and Kaushik, 2001).

According to the results, the MSDs that concern the knee joint hold a prominent position, among women. Standing, long walking in rough terrain in the field, uncomfortable postures and body twisting on the knees are some of the reasons that are responsible for the emergence of osteoarthritis (Birabi et al., 2012), meniscus and ligaments injuries (Suthar and Kaushik, 2013; Bridger, 2008).

The adoption of prolonged bending in the lumbar and the labor near the surface of the terrain for specific agricultural works strain the lumbar spine and are responsible for the prevalence of chronic pain and dysfunctions of female's agricultural population lumbar internationally (Rosecrance et al., 2006; Gomez et al., 2003;) despite all the implemented innovations in the agricultural sector (Engberg, 1993).

Social and psychological factors can also play a crucial role in the more frequent emergence of musculoskeletal pain in women because of their numerous domestic activities that enhance more their suffering and mental and physical burden (Menon and Seshadri, 2004). Additionally, women probably ache more, perhaps due to hormonal differences (Dimich-Ward et al., 2004). Regarding the male population, the highest frequency of MSDs, in comparison to the women, was observed in the area of shoulders. The harvesting of fruits as well as other agricultural works require long hour activity of upper extremities in a position higher than the level of the shoulders. A condition that imposes static load, leads to overuse injury. As the shoulder joint is the most mobile joint of the human body (Waris et al., 1979) the repetitive movements in the area and the continual exercise of muscular effort lead to the excess of the stamina limit of soft tissues as well as the joint itself (Rautiainen and Raynlds, 2002). Also, men use to a greater extent, the agricultural tools, a fact that probably enhances the exposure to hazards that function pre – open to the emergence of injuries in the specific area (Earle-Richardson et al., 2005).

The increased turnout in the department of physiotherapy and the registration of MSDs during the autumn and winter period coincides with the end of the agricultural season. The intensity of the agricultural work during spring and summer, apparently, acts as a deterrent to the search for physiotherapy, therapeutic

treatment of chronic musculoskeletal problems, to avoid the loss of working hours.

#### Limitations

There were many limitations in this study. Initially, it was not possible to clarify the causality of MSDs, whether they only emerged as a consequence of agricultural work. Additionally, taking into great account the retrospective study of the data, the distribution of MSDs per physical area wasn't feasible due to self – reporting of the patients. Consequently, the possibility of assessing accompanying health problems that may have been related to existing MSDs was therefore limited.

Future researches could focus on the functional burden due to the MSDs and their impact on the quality of life associated with health. Also, it is useful to investigate the profile of the farmer – leader of agriculture, as well as his wife's, as the typology of farmers' farms in relation to the type and frequency of the musculoskeletal disorder they suffer from.

#### IV. CONCLUSIONS

The results of the survey highlighted the phenomenon of the increased emergence of MSDs in the agricultural population of the research region. It is obvious that agriculture related people, men and women alike are exposed to many musculoskeletal injuries related to their work, to the extent that their prevention should be recognized as the highest priority as far as the issue of the safety of the agricultural holdings is concerned.

Knowledge and education related to the use of improved agricultural equipment, safe working methods and proper body position can contribute to the mitigation/ alleviation of musculoskeletal risks in agriculture, strengthening the agricultural community and restricting the musculoskeletal pains. Studies and articles confirm the importance of farmers training and ergonomic design of the tools used for the modification and re – examination of the adopted working positions (Vyas, 2014; Vyas, 2012; Costa and Camarotto, 2012; Cha et al., 2009; Menzel, 2007). Additionally, the great amount of factors of musculoskeletal diseases imposes their timely recognition and treatments as well as they are chronically treated.

**Competing interests:** None declared.

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