

## MUSCULOSKELETAL DISORDERS RELATED TO WORK AND THEIR RISK FACTORS: A STUDY IN THE SYSTEM OF MILK PRODUCTION IN SANTA CATARINA, BRAZIL HEALTH AND SAFETY

Leandra Ulbricht<sup>a</sup>; Leila Amaral Gontijo<sup>b</sup>; Adriana Maria Wan Stadnik<sup>a</sup>

<sup>a</sup> Universidade Tecnológica Federal do Paraná (UTFPR), Brazil

<sup>b</sup> Universidade Federal de Santa Catarina (UFSC), Brazil

### Abstract

This article aims to analyze the system of milk production and to identify risk factors for the development of Work-Related Musculoskeletal Disorders (WMSD). The methodology used was Ergonomic Work Analysis to identify risk factors, the prevalence of pain / discomfort and location of anatomical parts affected were established by the standard Nordic questionnaire and the study of comparative risk with other activities was carried out by the method of Jonsson. The main findings were the high prevalence of complaints of pain / discomfort (85.16%); a high risk of developing WMSDs among milkers as there were inadequacies in the workplace leading to harmful postures, equipment not appropriate for work and the presence of human skeletal muscle overload. The main anatomical regions affected were: 1) For men: wrists/hands, hips and thoracic spine; 2) For women elbows, wrists / hands, spine (thoracic and lumbar spine), hips, knees, ankles and feet. The pain also showed a characteristic multifocal where 33% of the milkers, had some type of pain in the three body segments. As for the production system it was found that hand milking may be considered a predisposing factor for pain in the wrists / hands, spine and foot / ankle.

**Keywords:** sistema de gestão de segurança e saúde no trabalho, serviço público federal, SIASS, SGSST.

### INTRODUCTION

Work-related Musculoskeletal Disorders (WMSD) are not a disease of modern times, they are associated with activities involving repetitive movements since the seventeenth century. However, after the Industrial Revolution there was a significant increase in the number of clinical cases reported and there were several epidemics. (Ulbricht, 2003)

Because of the wide variety of causative factors to be covered by a single term, there are several synonyms, and in Brazil the most used terms are WMSD (Work-related Musculoskeletal Disorders) and RSI (Repetitive Strain Injuries). In Brazil there is currently an epidemic of WMSD and about the prevalence of WMSD, it was found that most research focuses on urban work and relates the disease especially in industries with repetitive line production where the work had intensified and remuneration is based on productivity. However, agriculture is considered one of the three major occupational risk activities, along with mining and construction. (ILO, 1999)

This high risk is due to the multiple activities involved

in agricultural work, which may involve accidents with mechanical equipment, respiratory hazards, such as: crush injuries, kicks and bites of animals; accidents when handling chemicals, exposure to extreme heat or cold; skin diseases; hazardous noise levels and electrical hazards. (Pinzke, 1999)

These risks may also be increased costs due to psychosocial factors such as limited opportunities for holidays, high illiteracy rate, use of equipment and chemicals without the required qualification of the farmers on the use of these elements, and is still important to consider the workforce with high percentage of farmers over 65 years and the employment of children under fourteen years old in the labor activities (a workforce that is not normally found in other hazardous occupations). (Ulbricht, 2003)

Also, farmers claim that there is a lack of profitability which implies a lack of resources for the construction of a safe working environment and the lack of information about the risks. Thus, although the rates of mortality related to work activities which are deemed as dangerous have been present a decrease in the last decade, they see increasing in agriculture both in developed and underdeveloped countries. (Ulbricht, 2003)

Considering this above, this research had as objective to identify the risk factors related to Work-related Musculoskeletal Disorders (WMSD) among milkers of Santa Catarina and propose solutions that could improve the health of these professionals.

## LITERATURE REVIEW

Epidemiological studies indicate, according to Stal (1999), that farmers have a high risk occupation with respect to the Work-Related Musculoskeletal Disorders (WMSD) and these problems are an important field of research for the Swedish University of Agricultural Science, especially because the most part of agricultural work is associated with lifting, carrying heavy loads, inadequate postures, exposure to vibration from tools and work on the tractor, repetitive movements, particularly during milking and equipment are often traditional in their projects (Stal, 1999), just as happens in Brazil.

The worker, called the milker, must perform several operations beyond the extraction of milk (either manually or mechanically) and include transactions with the herd as: feeding, cleaning facilities, animal handling, care for sick animals, treatments prophylactic (like vaccinations), breeding herd (such as selection of animals to cross, artificial insemination, disposal of animals, etc ...). Some of these operations, according Pinzke (1999), are subject to accidents such as: kicking, gore, falling, slipping, crushing and musculoskeletal problems as well.

Gustafsson (1994) reported in his study of Work-Related Musculoskeletal Disorders (WMSD) in dairy farms, a significant difference between men and women milkers on the prevalence of symptoms in the neck (25% vs. 35%), shoulder (37% vs. 49%), elbows (18% vs. 22%) and wrist and hands (18% vs. 35%). The prevalence of pain was also confirmed in a study and Stål and Pinzke (1991) on the Work-Related Musculoskeletal Disorders (WMSD) among different milkers in dairy, where they investigated that the ability of women working is lower on average than that of men in muscle strength and aerobic work.

Compounding the problem, agricultural machinery and equipment are often designed for the physical requirements and capabilities of men. The heavy workload of women engaged in certain types of agricultural work is often disproportionate to their physical capacity. Furthermore, women who are involved in various tasks on a farm, also perform household chores such as preparing meals or laundry, which could aggravate musculoskeletal problems.

Under these circumstances, it becomes essential to the role of ergonomics in the prevention of WMSD. Kroemer

(1989) underscores this importance because the ergonomics are able to check how the work is done, the activities involved and the role of the employer. It is considered necessary to understand concepts of ergonomics in the perception about the reporting of those affected by the way as production is organized, the gestures used to pursue the work activity and the risk factors, so they can trace what kind of recommendations or interventions are.

Williams and Westmorland (1994) had confirmed this point of view by pointing out that many authors attach great importance to the adoption of ergonomic measures in the workplace for prevention and control of Work Related Musculoskeletal Disorders, and stress the importance of involving workers in training programs aiming to improve the workplace, making it healthier and safer.

The main goal of ergonomics is to adapt work to men and as there are high rates of complaints of pain and discomfort in the skeletal muscle activity milking, this field of study is relevant to increase the quality of life, safety and productivity of these workers. Thus, the adoption of ergonomic recommendations in dairy farms has been validated, as the study by Stal *et al.* (1996), which compared with the prevalence of WMSDs in Swedish milkmaids, demonstrated that the symptoms in the elbows, a significant difference among the milkmaids who had received instructions on how to work with the goal of reducing muscle stress, from which they had not received any ergonomic information.

## MATERIALS AND METHODS:

This exploratory descriptive survey adopted the Standardized Nordic Questionnaire modified by Ulbricht (2003), to profile the properties and milkers of Santa Catarina, Brazil, to determine the prevalence of WMSD and the anatomical regions affected. This step was defined by a quota sample where were interviewed 1105 milkers from all regions of the state of Santa Catarina (3% sampling error and confidence level of 95%).

Milker work was accompanied using the Ergonomic Work Analysis seeking to identify risk factors to be drawn up recommendations that could minimize them.

To quantify the risk of developing WMSD among the milkers, it was compared the frequency of onset of symptoms in this activity with Jonsson's methodology, which shows the risk of problems arising in organs of locomotor system between men and women of different professions from a study with a population of Eighty-four thousand, six hundred forty-three people of different occupations. (Pinzke, 1999)

It was performed descriptive statistics with measures of location (mean, median and mode) to find the frequency distribution on the axis of variation and scatter (standard deviation and amplitude) that indicate how much data is present scattered around central region. Data were analyzed by SPSS (Statistical Package for Social Science) to perform the statistical treatment which used the frequency distribution, the definition of quartiles to be used in exploratory data analysis, the test of chi-square association that allows testing the significance of association between two qualitative variables and finally, the Contingency Coefficient to measure the degree of association between the parameters studied. (Barbetta, 1999)

**PROFILE OF MILKERS IN SANTA CATARINA AND THE IMPACT OF WMSD**

The work of milk production (milking), can be conducted in three different production systems: manual system, mechanical system and mechanical system in the parlor-floor height differential for the milker (gap). For this research were interviewed 1105 milkers in the state of Santa Catarina, whose profile showed a median age of thirty-six years old, demonstrating the potential of this activity to set the men on the country side.

It was noticed also that they started working on the activity with the average age of fourteen years old, and this certainly turned out to influence their level of schooling, where the majority (62%) had only incomplet primary school.

It was identified a high weekly workload (average of 70.3 hours, with a median of 70 hours), which is explained by being a work that should be performed every day of the week (without breaks on the weekend or holidays).

Separating them by gender, it was found that 57% are male and 43% female, but, despite the majority being men, they are in business for less time than women (less than ten years, more than thirty-two years, respectively).

As for milking itself, it is performed almost entirely of properties twice daily (98%), taking on average one hour and 46 minutes, on average 7.6 animals to milk. From this, 625 (55.6%) of the milkers, milked six animals, either manually in 57.6% of farms.

With respect to the production system, it was identified that a large portion of the properties still uses hand milking (57.6%), while only 42.4% (469) took the milking machine.

As for musculoskeletal pain, it was found that 85.16% of the milkers were affected and there were statistical significance of pain in relation to sex (where women were more affected as shown in figure 1) and working time as milker (where the longer the major activity the longer number of people affected).

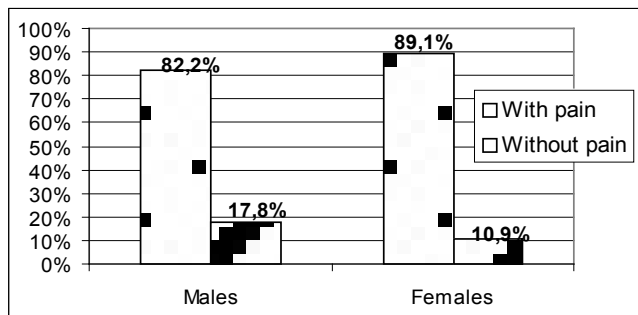


Figure 1. Pain and discomfort decrypted by 1105 milkers from Santa Catarina, Brazil. Ulbricht (2003)

Checking the data for pain and production system, it was found that milking can be considered a predisposing factor for pain in the wrists / hands, lower back and feet / ankles.

As the pain of the affected body segment, the data indicated that the segment of the upper limbs was the most affected with 70.2% (776) of complaints, followed by back to 61.3% (677) of complaints and so the legs and hips with 46.7% (516) complaints (figure 2).

The pain also showed a characteristic multifocal, where 15% (164) milkers showed all segments of upper limbs affected, 22% (248) of the milkers had pain across the back region, and 5.5% (61) with pain in the entire region of the lower limbs and hip.

Moreover, by making the intersection of pain with three body segments: upper limbs, back and legs, it was found that 33% (365) of the milkers, or one in every three, had some kind of pain in the three segments (figure 2).

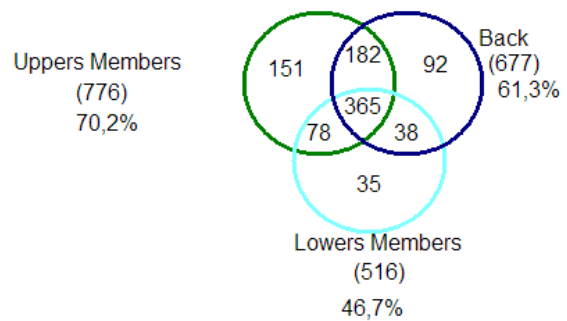


Figure 2: Multifocal pain and discomfort in milkers of Santa Catarina, Brazil. Source:Ulbricht (2003)

To check the tendency to chronicity of these conditions, it was observed that 48% (532) of milkers reported pain/ discomfort in the last seven days. Of these, 61% (291) women reported pain versus 38.4% (241) men, and the correlation between pain during the previous seven days and females was confirmed. There was also correlation between pain the past seven days, and milking system (milking), the body mass index (overweight in females), age of milkers (higher age, higher onset of pain) and time in activity (increases the time in the activity, increases the frequency of onset the pain).

## DISCUSSION OF EPIDEMIOLOGIC DATA DISTRIBUTION BY SEX

Several authors mention that there is a higher incidence of musculoskeletal disorders in women. In this study, 89.1% (425) of women reported complaints of musculoskeletal pain or discomfort in the last 12 months, versus 82.2% (516) of men. However, no one can say that WMSD reach more females, because some aggravating factors contributed to this relationship.

The double workday of women, which is considered by some authors as an aggravating factor of this situation is present since the average hours worked per week was actually higher for women 75.2 hours, compared to 66.4 hours worked by men.

Another aggravating factor found was the production system, where it was found that 63.5% of women performed by hand milking, 53% of men. Moreover, even in the milking parlor, it was apparent that the liners are often designed for the physical requirements (hand size) and capacities of men (weight of the liner).

Another factor cited as an aggravating factor is overweight. In search of Pinzke (1999), the author noted that women shorter and heavier than men, reported significantly more symptoms in the neck, shoulders, elbows, wrists / hands, upper back and hips than those reported by men. In this research, though not meet statistical significance between Body Mass Index - BMI (at or above 25) and musculoskeletal pain, data show a tendency to lie more pain among milkers overweight (91% of overweight women had pain, against 88% of those with normal BMI).

However, when it was used BMI to determine whether there was statistical correlation with respect to chronic pain, it was found that while 39% of overweight milkers reported pain the past seven days, it was confirmed statistically the relationship with the female where 66% of overweight milkmaids had symptoms in the last seven days.

Finally, while the median as the activity indicates that the men were in business for fourteen years, the women was in the opposite situation, twenty-seven years.

## DISTRIBUTION ACCORDING TO AGE

While the literature reports show that WMSD affect people mainly in the age groups where they are more productive, some authors, however, indicate that these factors may be more related to average age of these workers than any other reason.

In this research, it was found no statistical significance between musculoskeletal pain in the last twelve months and age of the milkers. The average age of this population was thirty-six years old (thirty-four years old for men and forty

years old for women) and 85.16% (941) milkers complained of musculoskeletal pain.

However, in the activity of milking, it was observed that many young people from the milkers follow their parents and learn from them the job. Thus, the average age at which they actually are responsible for service was fourteen years old (median of twelve), demonstrating that despite their musculoskeletal system is not yet fully developed they are to engage in daily activity (without breaks) that requires great physical strength.

However, it was found a statistical correlation for the relationship between time in the activity and musculoskeletal pain for both men and women (figure 3).

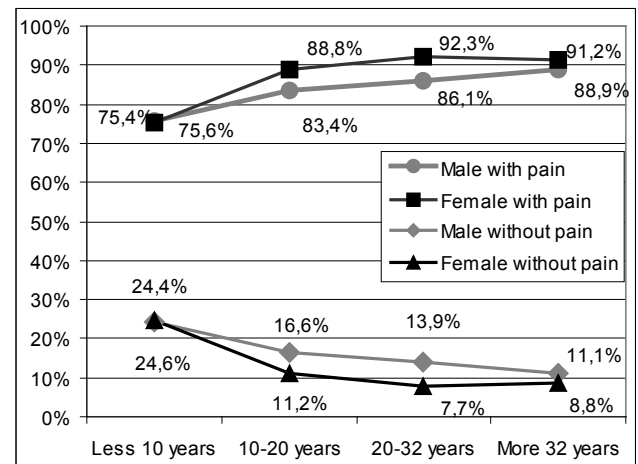


Figure 3. Relation between pain and time of work. Source: Ulbricht (2003)

Most authors agree in saying that there is no uniformity regarding the development of the disease and the time function, because data and previous occupations, sports, chores and general health status of workers must be analyzed.

However, this research shows that the sooner you start milking, the more likely to be affected by WMSD in the most productive age group. This statement can be more surely confirmed in this population because rural workers usually begin work in the very young, have no previous occupations and in general do not practice sports activities, factors that could affect this relationship. However, one should bear in mind that individual health status and the type of agricultural activity that can act play in this relationship.

Distribution according to activity and symptoms in the musculoskeletal system

In the literature review, research of Codo and Almeida (1995) with six thousand twenty people showed that the three lines of business most affected were the banking (35.5%), metallurgy (33.7%) and services sector (13.7%). Regarding the functions, assembler (30.2%), digitizer (18.7%) and cashier (13.1%) were the hardest hit.

Milking activity found a percentage of 85.16% (941) milkers affected. When it is compared with the percentage found in other populations, despite the methodological differences between studies, it was possible to conclude that this activity presents a great risk of developing musculoskeletal diseases.

The data found in this study were similar to Swedish data where 82% of men and 86% of women reported some type of symptom (82.2% men and 89.1% of women in Santa Catarina).

When comparing the data of this activity with the method of Jonsson, who defined the risk skeletal muscle at high and low based on research with 84 643 people with different occupations, it appears that the milkers are at risk of developing WMSD for all of body segments studied. The tables 1 and 2 also show that female milkers are at greater risk than males.

Parameter	Male		
	SC %	Low	High
Neck	25,5	<20	>30
Shoulders	27,7	<15	>35
Elbows	9,7	<5	>15
Wrists/Hands	<b>43,5</b>	<5	>20
Upper Back	<b>29,8</b>	<5	>15
Lower Back	47,6	<30	>50
Hips/Thighs	<b>16,9</b>	<5	>15
Knees	24,7	<20	>30
Ankles/Feet	13,7	<10	>20

Source: Ulbricht (2003).

**Table 1.** Frequency of symptoms among male milkers of Santa Catarina, Brazil.

Parameter	Female		
	SC %	Low	High
Neck	38,6	<30	>55
Shoulders	47,6	<30	>55
Elbows	<b>21,6</b>	<5	>20
Wrists/Hands	<b>64,1</b>	<15	>35
Upper Back	<b>37,3</b>	<10	>25
Lower Back	<b>54,7</b>	<35	>50
Hips/Thighs	<b>30,4</b>	<10	>20
Knees	<b>36,7</b>	<15	>30
Ankles/Feet	<b>25,8</b>	<10	>20

Source: Ulbricht (2003).

**Table 2.** Frequency of symptoms among female milkers of Santa Catarina, Brazil.

## EFFECTED ON THE MUSCULOSKELETAL SYSTEM AND THEIR RELATIONSHIPS WITH PREVIOUSLY REPORTED DATA

The research of Codo and Almeida (1995) with six hundred twenty people showed that the wrist (20%), forearm (15.1%), hand (12.3%) and cervical (11.8) were the anatomic regions most affected.

Gustafsson (1990) in his survey of 3000 Swedish milkers described a high incidence of WMSD. Pain and discomfort in the shoulders were reported by 35% of men and 34% of women (Santa Catarina, Brazil, 27.7% of men and 47.6% women). While the pain and discomfort in the wrists and hands affected 18% of men and 35% of women (Santa Catarina, Brazil, 43.5% of men and 64.1% women).

The differences found between the incidence between Brazilians and Swedish should be related to the production system adopted (as in Sweden where 100% of mechanical milking in Santa Catarina, Brazil, 57.56% of milking are still manual, which requires more strength, repeatability and static positions of upper limbs).

## PREDISPOSING FACTORS FOUND

It was shown that problems related to WMSD reach various groups of professionals, including milkers, and the situations that trigger their appearance have in common the use of excessive force, the taking of extreme positions and the performance of repetitive movements or prolonged efforts.

According to Oliveira (1998), the request physical elements combined to trigger, resulting in overuse of the tendons and muscles elevating the risk of injury when they are associated with poor posture, static muscle contractions and rapid movements and / or repetitive.

The risk factors of WMSD are therefore multi-causal and interdependent; it is not solely related to repetitive factors. Thus this study of milking, split into groups predisposing factors, described below:

a) The degree of suitability of the job: the job is often inadequate, requiring a permanent outlet squatting posture and several lateral deviation of the spine and neck so that the milker can view the animal's udder. It is noteworthy that even in properties with floors of different height for the milker (gap), which allows the standing work, they were built without space for the placement of the feet and with fixed bars inappropriate to the area of vision, which led the adoption of postures or movements that may cause or aggravate musculoskeletal impairments.

b) The pressure on the body tissues: it was found that in cold regions, low water temperature can reduce the sensitivity to touch and increase the force applied to the

milking which can lead to localized pressures on the tissues and / or nerve paths.

c) As the postures: the work postures were influenced by individual factors (taller individuals are more curved than the lowest to view the animal's udder, the manner of milking where some use their arms in a more static way than others) and occupational by inadequate workplace and equipment (buckets with thin handle, liners that do not adapt well to female hands, containers being loaded manually, etc. ...), may trigger diseases by the additional load on the joints and / or muscles.

d) The musculoskeletal load: increased milking manual that requires strength and repeatability, in the three systems by adopting static postures of the upper limbs and weight bearing, adoption of the squatting position (manual and mechanical with bucket at the foot) that increases load on knees and hips.

e) The static load: present mainly in manual milking.

f) As the cognitive demands: some milkers reported tensions in dealing with sick animals, first hatch or activities such as artificial insemination (the pressure in no errors), and complaints regarding the price of milk, which can lead causing increased muscle tension or to cause a generalized reaction to stress (Eg.: "we work hard and we saw little result, the farmer is not valued. The work is inhuman"). In the literature stress is seen as a factor triggering the onset of WMSD.

g) With respect to organizational and psychosocial factors related to work: the work of milking does not allow breaks, which generates many complaints (Eg.: I cannot leave, I have to clean the stables"). Moreover, in general the training focuses on product quality and not how the work could be done by avoiding inadequate postures or ways of carrying load. This way, it can be triggered a pathological process that varies among individuals because of the physical characteristics of the load (especially gender), personality, past experiences and the social situation of each person's work which, according to Frederick (1992), may be exacerbated when these factors appear in combination.

h) The production system: it was found that the manual pumping might be considered a predisposing factor for pain in the wrists / hands, lower back and feet / ankles.

i) Time on activity: data indicate that the longer the activity, the greater the incidence of pain / discomfort skeletal muscle, and the increase in complaints occur in the first 20 years.

In addition, to evaluations of particular cases should be considered non-work related factors such as congenital problems, acute injuries, chronic disorders, aging and recreational factors (Helfestein, 1997, ARMSTRONG et al., 1987).

## CLINICAL ASPECTS OF WMSD IN MILKING AND THE MULTIFOCAL ASPECT OF PAIN

According to Helfenstein (1997), those affected have a polymorphous clinical state, except in the presence of pain, which occurs in all cases, and the fact that they generally do not like their work. In this study, there was a contradiction to this statement where 63% of milkers liked what they did and 47.25% described their work in a pleasant way.

Littlejohn (1994); Helme *et al.* (1992) described that affected individuals can develop a state of pain that spreads, and in this research it was confirmed the appearance of multifocal pains where 33% of milkers (one in three), had at least some kind of pain / discomfort in the three body segments (upper limbs, hips and legs and back). Putting up this information in terms of people affected, there were forty-three thousand, one hundred sixty-five milkers with multifocal involvement in the three body segments.

Thus, according to Buckle (1987) and to this research data, it can be stated that the framework of WMSD not limited to the region cervicobrachial, as some researchers believe, because the painful symptoms are more diffuse.

## SEQUELS

The literature describes that the sequels can be physical, psychological and socio-economic. In this kind of activity, the three possibilities are together because the physical sequel, for example, ultimately leads to the sale of animals for the inability to milk them or hire someone to do it.

In psychological recovery to Souza (1994) stating that says the disease poses a double threat, as well as affects the health, it also affects the productive capacity, especially among milkers who lack skills and education to pursue other professional activities not manuals are making it impossible to insert any other type of work.

So, even when sick, even feeling pain, the milker cannot stop working for lack of resources, resulting in worsening of their clinical status (Eg.: "I liked a lot, but now I feel tired, pain, everything hurts" "I have to work with my pain"). And it was very clear in this study, where although 85.16% of milkers complain of pain/discomfort, only 6.4% stopped working last year due to pain. The reports point to the inclusion of children in this activity, to share the workload with the father or mother who can no longer milking all animals alone.

Regarding the socio-economic, the literature indicates that the first difficulty encountered by a WMSD carrier refers to diagnosis, since it is impossible to present any objective symptom initially as swelling, inflammation, acquires a tragic character, because at the time the person starts to present a more clarified symptoms, it can be characterized the irreversibility of the framework and permanent disability.

With the milkers, this situation is very worrying. In the interviews it became very clear, they were looking for doctors only when the pain left them no option, and these physicians were in general the public network and assigned to health institutions in the inner country, which the Public Social Assistance itself possess asymmetric information about the diagnosis and treatment of this pathology. In addition, workers have to face a long bureaucratic process to obtain clearance or retirement, compounded by the fact that in the cities where this study happened there was not even a physical therapist to monitor the treatment.

The literature describes also another side to this pathology in addition to affecting the health of workers and thus increase the medical / hospital costs, it also affects productivity and the quality of your service (Ram & Couto, 1997), because a worker with chronic or painful episodes has lower performance and efficiency when compared to an asymptomatic individual, including impairing your mood and your job satisfaction. (Bly *et al.*, 1986).

In such a way, there is a significant issue of socio-economic impact due to Work-Related Musculoskeletal Disorders, which beyond suffering to generate employee costs due to reduced productivity, treatment, and by early retirements. (Greenberg, *et al.*, 1995, Hurley, 1996)

## PROPHYLACTIC MEASURES AND RECOMMENDATIONS

As the WMSD are multi-causal and it is known that when several factors are combined the worst manifestation of the disease, this research aimed to develop recommendations that could help improve the quality of life of the milkers' work.

## THE DEGREE OF SUITABILITY OF THE JOB

It could be said that the ideal job is the one that allows a change in postures. Thus, milking bucket on foot with manual and mechanical, it is recommend using a stool and make an alternation between staying squatting and sitting on it (which can be coupled by a belt at the waist and legs milker, leaving their hands free).

You can also build the stalls, with more space between them. In the practice it was found that the milkers to work among the animals interspersed empty one.

In properties where there is a gap, it is recommended to leave space for the placement of the feet of the milkers and the iron bars are mobile, so that each professional can put them in a suitable height, enabling the visualization of the field work without the need for curvature of the spine and neck.

## EQUIPMENT AND TECHNOLOGY USED

In general there is a clear lack of support equipment for this activity, such as containers that are loaded by milkers which could be placed on carts with wheels, the buckets could have wider straps to adapt better to the shape of human hand among other adjustments.

The liners, as seen in Swedish dissertations, again not adapt well to female hand, and must use your fingertips to get this equipment to maintain safe and still turn it over to the connection.

One can certainly, from the results of this research, said that the milking machine is less harmful to the musculoskeletal system than the manual and recommend the use of this technology in the properties to improve the health of the milkers. In addition, the pipe (milk ducts) is recommended because it eliminates many steps that require the handling of loads (buckets of milk), reducing the physical load of the milkers.

## ENVIRONMENTAL CONDITIONS OF WORK

There were no complaints about the noise of the milking, inadequate lighting or ambient temperature, yet the literature reports that reduce the stress of workers should follow the regulatory standards regarding physical factors (ventilation, lighting, temperature, humidity and noise) environment work, and improve the social factors as workload, adapting to new technologies and changes in the workplace. According to the Ministério da Previdência e Assistência Social (Social Assistance) (Brasil, 1997), among the various environmental conditions, it is known that thermal comfort, visual and acoustic ensuring compliance activity with lower physical and mental, because they favor the adoption of gestures of action, observation and communication, providing greater efficiency and safety for workers.

Thus, it is recommend that in the warmer months of the year to take some care with respect to heat, and the milker could lead to a dairy farm milk bottle with water or lightly sweetened tea natural temperature (more easily absorbed by the system digestion at this temperature) for every ten or fifteen minutes to eat one cup of liquid, and in very hot spaces, it can be installed ventilation equipment (fan on the wall or ceiling) to reduce heat.

With respect to acoustic comfort, it could be contacted the manufacturer and verify the possibility of lowering the noise of the milking or put it in a soundproof box, when its installation.

As for social factors, during training time, could be suggested that when there was the possibility, at least two family members taking turns in the milking, especially

on the weekends to reduce fatigue and allow at least two days rest skeletal muscle and the possibility of some activity recreation (visiting neighbors, going to church, playing, or even holidays, among other possibilities).

As the adaptation of new technologies and changes in the workplace, they could be included in training that would focus not only on the quality of milk produced, as well as improving the health of the milkers, including knowledge about the disease (symptoms, etiopathogenesis, consequences, preventive measures, early treatment and rehabilitation), use of stool, the introduction of rotation in labor and changes in the tasks to decrease the effect of static postures and repetitive movements, such as the support of the elbows in the legs during milking manual.

Moreover, we stress the importance of addressing the fix through courses and sensitization (using the rural unions), the long working week of milkers, ranging 42-84 hours, showing that you add all the activities they perform have a grueling routine dedicated exclusively to work.

#### TECHNICAL SUPPORT TO THIS ACTIVITY:

As the WMSD are related to labor and workers affected should receive support when the need for leave, the technicians involved in support of dairy farming should receive training about the disease (symptoms, pathogenesis, consequences, preventive measures, early treatment and rehabilitation), so they can inform the milkers.

#### CONCLUSION

This paper demonstrates that the WMSD can also affect rural workers while outlining a worrying framework about the incidence of WMSD in the area of milk production in Santa Catarina, Brazil. This is because 85.16% of the milkers were affected by this disease that affects the workers in their most productive ages. It is irreversible in advanced frames and it has a difficult diagnosis.

Regarding the profile of the milkers, it was found that the average age of thirty-six years old, they began in activity at around fourteen years old and who had a high weekly workload (seventy hours).

As the distribution of pain in relation to sex, despite the statistical analysis indicated a positive relationship with the female, it could not safely be said that women were more affected than men because there were a number of risk factors between women and absent among male milkers respondents as, the feminine workday was longer than the male, the majority of women performed by hand milking, the equipment was more suited to the needs male and overweight among women was higher than among men.

As for musculoskeletal pain, it was showed that 85.16% of the milkers were affected and that 48% of the milkers had chronic, in other words remained in pain for the past seven days prior to the interviews.

Among the risk factors found during the ergonomic work analysis were that the inadequacy of jobs makes the milker adopt awkward postures in many of its subtasks, including subtask of the extraction of milk, getting to do the work of squatting, adopting static postures in the upper members and repetitive movements of the wrists / hands. It might also show the inadequacy of equipment and utensils used in the activity, early activity, a strenuous routine, the mental demands and lack of training which focused on new ways to develop the work to spare the musculoskeletal system of workers.

Thereby, one of the main contributions of ergonomics in this context, than the recommendations presented in three basic pillars: psychosocial conditions, equipment and technology used, and the adequacy of the job, refers to an awareness of the problem.

As for the production system it was found that hand milking could be considered a predisposing factor for pain in the wrists / hands, spine and feet / ankles, as well as working time in the activity.

Other factors such as milkers' age and their Mass Corporal Index who had a tendency as a predisposition to the onset of WMSDs in the last twelve months, confirmed to be statistically related to chronic pain (when considering the maintenance of the past seven days preceding the interviews).

Finally, the characteristic of pain was multifocal, with one in three milkers (33%) had problems in the three body segments.

Small farms are immense socio economic importance especially in Santa Catarina dominated by intensive farming based on family labor (keeping people in the countryside), representing 75% of all employed persons and keeping 66% of the total dairy herd. It is essential to study this kind of work to make it safer, in order to preserve the health of farmers, enabling them to improve their quality of life.

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