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Araştırma Makalesi

The Effect of Functional Capacity Related Ergonomic Risk Factors on Quality of Life of People with Physical Disability

Fiziksel Engelli Kişilerin Çalışma Kapasiteleri ile ilgili Ergonomik Risk Faktörlerinin Yaşam Kalitesine Etkisi

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ABSTRACT

Purpose: The purpose of this study was to investigate the ergonomic risk factors and the problems of functional capacity and their effect on quality of life of people with physical disability. **Material and Methods:** 52 people with physical disability were assessed. Ergonomic risk factors have been analyzed with Ovako Working Posture Analysis System, Rapid Upper Limb Assessment and General Ergonomic Risk Analysis Checklist. Muscles strength, pinch strength, grip strength, lifting strength were measured at J-TECH computerized functional capacity assessment unit. Quality of life was assessed by SF-36 Health Survey. **Results:** Most of the participants have been found to work at high risk postures and this give rise to work-related musculoskeletal disorders. When compared with quality of life which is investigated by SF-36 Health Survey, general health status perception is found to be related by many risk factors ($p< 0.05$). ın addition, general health perception is found to be affected by social function as much as physical function. The importance of pinch strength, grip strength, lifting strength and upper extremity strength in perception of quality of life has been shown. **Discussion:** The results show that projects for increasing productivity and satisfaction of people with physical disability at work should be done and increasing awareness of the employers about functional capacity related ergonomic risk factors is important.

Keywords: People with disability; Functional capacity; Ergonomics; Quality of life

ÖZ

Amaç: Bu çalışma fiziksel engelli kişilerin ergonomik risk faktörleri ve çalışma kapasitelerini belirlemek ve ilgili sorunların yaşam kalitesine etkisini ortaya çıkarmak amacı ile yapılmıştır. **Gereç ve Yöntem:** Çalışma 52 fiziksel engelli kişi ile gerçekleştirilmiştir. Ergonomik risk faktörleri analizi olarak Ovako Çalışma Postürleri Analizi Sistemi, Rapid Upper Limb Assessment ve Genel Ergonomik Risk Analizi Kontrol Listesi kullanılmış, J-TECH Çalışma kapasitesi değerlendirme ünitesinde kas kuvveti, çimdikleme kuvveti, kavrama kuvveti, kaldırma kuvveti değerlendirmesi yapılmıştır. SF-36 Sağlık Taraması ile yaşam kalitesi değerlendirilmiştir. **Sonuçlar:** Katılımcıların çoğunun yüksek riskli postürlerde çalıştığı ve bunun işle ilgili kas-iskelet bozukluklarına yol açtığı görülmüştür. Yaşam kalitesi ile ilgili olarak SF-36 Sağlık Taraması Anketi ile karşılaştırıldığında, özellikle genel sağlık durumu algılaması ile birçok risk faktörü arasında ilişki olduğu belirlenmiştir ($p< 0.05$). Ayrıca, genel sağlığın aslında fiziksel fonksiyon kadar sosyal fonksiyondan da etkilendiği belirlenmiştir. Yaşam kalitesinin algılanmasında parmak ucu kuvveti, kavrama kuvveti, kaldırma kuvveti ve üst ekstremite gücünün önemi de belirlenmiştir. **Tartışma:** Fiziksel engelli kişilerin çalışma sırasındaki verimliliklerinin ve memnuniyetlerinin artırılması yönünde çalışmalar yapmak ve çalışma kapasitesi ile ilgili risk faktörleri konusunda işverenlerin farkındalığının artırılması önemlidir.

Anahtar Kelimeler: Fiziksel engelli kişiler; Çalışma kapasitesi; Ergonomi; Yaşam kalitesi.

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The level of development of a country is directly proportional to the level of social welfare of individuals living in that country. Another important indicator of countries' development measures is the welfare level and quality of life of people with disabilities living in that country. Employment has a fundamental influence on the economic independence of people with disabilities and on the improvement of quality of life and community integration (Pigini, Andrich, Liverani, et al, 2010; Nevala-Puranen, Seuri, Simola, et al, 1999; TC, ÖİB Özürlüler Şurası, 2009). Today, the most important way to enable people with disabilities to be productive is to increase their employability and to take part in working life as active producers (Pigini, et al, 2010; Nevala-Puranen, et al, 1999). By this way, they will not only be economically dependent on others and will perceive themselves as people who are productive and efficient but they will also contribute to economy (Pigini, et al, 2010).

People with disabilities who are newly being employed in most of the countries are mostly employed without being evaluated for working capacities and ergonomic risk factors, and without being taken into ergotherapy programs. There is no employment policy, which is set according to general and objective measurements and which provides a standard of practice for people with disabilities in our country (TC ÖİB Özürlüler Şurası, 2009).

People with physical disabilities should be assessed for working capacity and placed in appropriate jobs (Wehmann, Revell, Kregel, et al, 1991; Lyth, 2001; Gross, 2004; Cotton, Schonstein, & Adams, 2006). The determination of the working capacity of the person is carried out in a number of different assessment methods. At the same time, job analyzes are performed to determine the appropriate jobs. After all, matching of the physical and cognitive needs of the job is required, and then it is decided if the person with disability should be placed in the job or in an ergotherapy program (Wehmann, et al, 1991; Lyth, 2001; Erbahceci, Kayıhan, Uyanık, et al. 2000).

Being employed or having a job is shown as an important determinant of quality of life (Post, Van Der Sluis and Duis, 2006). However, unsuitable working postures in jobs that require intensive labor force cause inefficiency as well as musculoskeletal disorders (Akay, Dağdeviren and Kurt, 2003; Zolna, Sanford, , et al. 2007). The quality of life of the people with physical disability, both physically and emotionally negatively affected by workplace conditions, is adversely affected. The importance of risk analysis of the workplace and its surroundings, the equipment to be used, etc., following the appropriate work provided, is expressed (Nevala-Puranen, et al, 1999; Duger, Uyanık and Kayıhan, et al, 1995). Working with minimum ergonomic risk factors is a very important step in respecting the work they do and creating the motivation to carry it out in the best possible way for people with physical disabilities. (Kaygisiz, 2018; Escorpizo, Finger, Glassel, et al, 2011; Ahasan, Campbell, Salmoni, et al, 2001).

Ergonomic risk analyzes are used to determine the ergonomic risks in the workplace. The methods of assessing work postures of a worker are used to adaptation to work conditions and to prevent work-related musculoskeletal problems. The assessment of risks, such as the use of hands and related equipment, physical energy loads, musculoskeletal system loads, computerized work environment, environmental conditions, general workplace, tools or instruments, glove and management are also important roles in creating a suitable work environment where one can demonstrate his knowledge and skills (Pendelton and Schultz-Krohn, 2006; Kaygisiz, 2018).

This study is planned to determine the effect of ergonomic risk factors and working capacities to the quality of life of people with physical disabilities who have been employed and doing similar work.

MATERIAL AND METHODS

In order to conduct the study, permission has been received from the Ministry of Labor and Social Security to scan the records of employees and visit them at workplaces. The records of the Disability Employment Unit have been scanned to determine those who have inclusion criteria which was: to have a physical disability level of 40% or more as determined by the Health Board report of the Ministry of Health for at least two years, to be 18 years old or over, to work full time (at least 8 hours a day) for at least one year. 60 people were selected from the records and telephoned. 52 persons who were determined to be suitable for study and who agreed to participate were visited. Permission and approval have been obtained from the Medical, Surgical and Drug Research Ethics Committee of the Hacettepe University Faculty of Medicine. (Ethics committee decision no: HEK:09/14 – 26) The informed consent form approved by the Ethics Committee of Hacettepe University was signed.

Outcome Measures

Demographic, medical and work information have been

obtained.

Owako Working Posture Analysis System (OWAS): Dynamic posture analysis was performed using the Owako Study Postures Analysis System (OWAS) (Karhu, Kansi, Kuorinka, 1977; Karhu, Harkonen, Sorvali, et al. 1981). During the workplace visit, participants were asked to be in the position they used most frequently during the day and their postures were examined. According to OWAS, the back, upper extremities / shoulders, lower extremities, head and lifting postures were examined. The analysis score ranged from 5 to 23 and the best study posture was rated at 5 and the worst study posture at 23.

Rapid Upper Limb Assessment (RULA): This assessment method was used to determine risks to which upper extremities were exposed during the study (McAtamney and Corlett, 1993). People were asked to be in the position they used most frequently during the day and their postures during this study were examined. The risk analysis of each level in this system, which determines the working posture of the head, neck and upper extremities of the person by a fast and systematic assessment method, is given below.

General Ergonomic Risk Analysis Checklist: This checklist was conducted to determine risks related to use of hands and related equipment, physical energy loads, musculoskeletal system loads, computerized workplace, environmental conditions, general workplace conditions, use of tools or vehicles, use of gloves and management. It includes total of 54 risk analysis questions answered as 'Yes' or 'No'. 'Yes' indicates that there is a risk and 'No 'indicates that there is no risk. Adding 'Yes' gives total risk score (Pendelton et al, 2006).

J-TECH Functional Capacity Evaluation (FCE): Working capacities of physically disabled people participating in the study were evaluated with the J_TECH Tracker Computerized Functional Capacity Assessment System (J_TECH TRACKER Version 5, 2008). Following parameters were assessed: Pinch force with pinch track module, grip force with grip track module, static lifting with lift track module, muscle strength with tracker dynamometer.

Quality of Life Evaluation: The quality of life of participants was evaluated by SF-36 Quality of Life Questionnaire (Ware, 2000; Koçyigit, Aydemir, Fisek et al, (1999). Eight health dimensions and scale were used to determine functional status, well-being and general health status. The total score of each scale ranged from 0 to 100, with a high score indicating good health.

Statistical Analyses

The quality of life, ergonomic risk factors and functional capacity of the subjects participating in the study were compared with Spearman Correlation Analysis. Values between 0.00 and 0.25 in the correlation values were in good / poor correlation, between 0.25 and 0.50 in the moderate relationship, between 0.50 and 0.75 in the good relationship and between 0.75 and 1.00 in the perfect relationship.

RESULTS

52 people, 40 male (76.9%) and 12 female (23.1%), aged between 22 and 70 years, who are registered with the Private Employment Division of The Ministry of Labor and Social Security and assigned to any government agency or private organization, has been assessed. It was determined that 90.4% (47 people) were right dominant and 9.6% (5 people) were left dominant. 51.9% (27 people) of the participants were high school graduates, 17.3% (9 people) primary school graduates, 17.3% (9 people) middle school graduates and 11.5% (6 people) finished university. 57.7% (30 people) were married and 42.3% (22 people) were single. All of the participants are working full-time, 8 hours a day. Average total working time in their current workplaces is 10.90 ± 7.66 years. Medical conditions and working conditions of participants are shown at Table 1 and 2 respectively.

In terms of back posture assessed by OWAS, it was found that 51.9% (27 people) of the participants had a straight back during working, and the remaining 48.1% (25 people) had a bent back or rotation of more than 20 degrees. Upper extremities were mostly below the shoulder level (82.7%) without contact with the body, while the lower extremities were mostly sitting below the hip level (75.00%). It was determined that 19.2% (10 people) of the participants were walking or moving during their duties. 80.8% (42 people) of the participants were head freelancers. The ratio of persons working with head bent forward was 17.3% (9 persons). Only 1 person (1.9%) was working in rotation. 71.2% (37 people) of the participants were working without any load, 21.2% (11 people) were carrying less than 10 kg and 7.7% (4 people) were carrying between 10 kg and 20 kg.

Table 1. Medical Conditions of Participants

		n= 52	
		N	**%**
Reason of Disability	From Birth	21	40.4
	Accident	10	19.2
	Disease	18	34.8
	Other	3	5.8
Affected Part of the Body	Upper Extremity	18	34.8
	Lower Extremity	34	65.2
	Trunk	6	11.6
Independence Level	Walking	41	78.8
	Wheel Chair User	11	21.2
Type of Assistive Device	Whell Chair	11	21.2
	Crutches	2	3.8
	Prostesis	1	1.9
	Canadien	1	1.9
	Not Using	37	71.2
Walking Distance	Indoors Only	3	5.8
	Community Limited	27	51.9
	Community Unlimited	22	42.3

Table 2. Working Conditions of Participants

		n= 52	
		N	**%**
Workplace	Public institution/assembly	39	75
	Municipality	3	5.8
	Private Company	3	5.8
	Public Bank	2	3.8
Task /Responsibilities	Officer	30	57.7
	Servant	10	19.2
	Accountant	4	7.6
	Nurse	4	7.6
	Medical assistant	2	3.8
	Attorney	1	1.9
	Branch manager	1	1.9
Transportation to workplace	By own car	38	73.1
	By driver	6	11.5
	Public transport	3	5.8
	Other	5	9.6

Accoring to RULA results, only 5.8% of the 52 participants (3 persons) were working without risk in an acceptable posture during the working hours. It was seen that 40.4% of the participants (21 people) had some risk in working posture, they were working in wrong or curved position. It was found that 48.1% of the participants (25 people) had a high risk of injury as they were in a bad posture. Three people (5.8%) were working in the worst possible position with the possibility of injury at any time.

The results of General Ergonomic Risk Analysis Checklist show that 61.5% (32 people) of participants had no risk in using hands-related equipment and 38.5% (20 people) had varying amounts of risk. It was determined that 55.8% (29 people) of participants did not have any risk related to their energy burdens and 44.2% (13 people) had varying amounts of risk. It was found that 11.5% (6 people) of participants did not have any risk related to musculoskeletal loads and 88.5% (46 people) had varying amounts of risk. It has been determined that 48.1% (25 people) of the participants use computers and 51.9% (27 people) do not use computers and only 4% (1 person) of the participants using computers did not have any risks related to the

business area using computers, and the remaining 96% (24 people) had varying amounts of risk. It was determined that 57.7% (30 people) of participants did not have any risk due to environmental conditions and 42.3% (22 people) had varying amounts of risk. It was found that 38.5% (20 people) of participants had no risk related to general workplace conditions, 61.5% (32 people) had varying amounts of risk. The risk of ¼ was found in 5.8% of 3 people who were using tools or devices. 11.5% (6 people) of participants did not have any risk related to management and 88.5% (46 people) had varying amounts of risk.

J-TECH-FCE results indicated that fingertip strength of the participants was 7.47 ± 3.88 kg in the left hand, 8.56 ± 4.02 kg in the right hand, 34.18 ± 19.27 kg in the left hand, 38.82 ± 20.21 kg in the right hand, and 19.72 ± 13.78 kg in the right hand. Lower extremity and upper extremity muscle strengths were measured on both left and right sides and averaged.

The Comparison of Individuals Ergonomic Risk Factors with Quality of Life

Most of the participants have been found to work at high risk postures and this give rise to work-related musculoskeletal disorders. High risk at work areas has been observed to be related to some parameters of quality of life. Significant correlations were found between the RULA results and quality of life parameters of the physically handicapped participating in the study except for the pain parameter. RULA results have a moderate but significant relationship with the social functioning parameter, ($r = -0.41$, $p < 0.005$) the general health parameter ($r = -0.54$, $p < 0.005$) and the mental health parameter ($r = -0.41$, $p < 0.005$), and a weak but significant relationship with the physical functioning parameter ($r = -0.25$, $p < 0.005$), the energy / vitality parameter ($r = -0.36$, $p < 0.005$), the physical role parameter ($r = -0.34$, $p < 0.005$) and the emotional role parameter ($r = -0.27$, $p < 0.005$).

Some of the parameters of the quality of life were found to be related to the postures of the individuals at workplace measured by OWAS. Social functioning ($r = -033$) and pain parameters ($r = -0.31$) of quality of life were found to be in a low but significant relationship with the overall OWAS outcome ($p < 0.005$). General health ($r = -0.48$) and physical role parameters ($r = -0.48$) of quality of life were found to be moderately related with the overall OWAS outcome ($p < 0.005$).

In the general ergonomic risk analysis of participants, there was no relationship between quality of life parameters and risk factors arising from use of equipment, physical energy loads, computer work area and environmental conditions ($p > 0.005$). Musculoskeletal loads and physical functioning, social functioning, energy / vitality, pain and mental health parameters of quality of life were significantly correlated ($p < 0.005$). There were significant weak correlations between working area and social functioning, energy / vitality, physical role weakness and mental health parameters of quality of life. ($p<0.005$). Also, amount of risk associated with management and social functioning, energy / vitality, physical role ambiguity, emotional role weakness and mental health parameters of quality of life, and risk amount at general workplace conditions and physical functioning, social functioning, energy / vitality, physical role parameter of quality of life are found to be in a weak but significant relationship ($p < 0.005$).

Comparison of Individuals Functional Capacity Evaluation Results with Quality of Life

The average finger strength of the right hand and left hand of people participating in the study is significantly related to general health, energy / vitality and physical role weakness parameters of quality of life. In particular, general health parameter was found to be well correlated with finger strength. ($r = 0.51$, $p = 0.002$) Energy / vitality and physical role parameters were found to be weakly related. Mean grip strength was found to be significantly and positively related to the general health parameters of the quality of life. ($r = 0.46$, $p = 0.004$) Lifting strength were weakly related to physical functioning and general health perception of quality of life.

There was a moderately significant association between hip muscle strength and physical function parameters of the quality of life. ($r= 0.45$, $p= 0.002$) Strength of hip flexion, extension, internal rotation, abduction and adduction movements has a weak but significant relationship with the social functioning parameter of quality of life.

There was a weak relationship between all muscle strengths measured in the upper extremity

and the energy / vitality parameter of the quality of life. General health parameter of quality of life was found to be in a weak but significant relationship with strength of shoulder extension, wrist extension and hand supination movements. Physical role parameter of quality of life was found to be weakly correlated with elbow flexion and wrist extension strength.

A significant moderate relationship between oblique abdominal muscle strength and energy / vitality parameter of the quality of life was found. Physical function and energy vitality parameter of quality of life quality are found in a moderate relationship with anterior abdominal muscle strength. Back extensors strength had a weak relationship with the social function and the physical role parameters of the quality of life.

DISCUSSION

This study investigated effects of ergonomic risk factors and problems of functional capacity on quality of life of people with physical disability employed in any state or private institution. A total of 12 women and 40 men employed at Northern Cyprus were assessed with a mean age of 37.15 ± 9.66. Rate of women is 8.52%, rate of man is 28.41%. According to the directives of European Union, equal treatment for employment should be applied for people with physical disabilities (TC, ÖİB Özürlüler Şurası, 2009). In this respect, it is important to encourage public and private sector about employment of women.

Adapting work and business environment in accordance with functional capacity of employee can create alternative business opportunities for employees. There are a number of studies on job regulations in this regard (Nevala-Puranen, et al, 1999; Colombini and Occhipinti, 2006). Study done by Nevala et al. 1999, stated that regulations in workplace were made less than in home environment. In addition, it has been determined that more people with disabilities are more likely to have workplace arrangements than those who have congenital disabilities and those who use wheelchair or assistive devices. It has been shown that people with physical disabilities can best benefit from modification needs of their own workplace. Ergonomic arrangements to be made with physical measurements are necessary for the modification of workplaces. It is very important to determine how a person with a physical disability works, what factors affect his work, and how work and environment should be regulated. Studies on workplace regulations and business adaptations should be expanded. If such regulations are not made, it may be possible to leave the job. It is very important to ensure sustainability in disability employment. It is necessary to evaluate the risks and work capacity of the workplaces and to support the working life of the employees and increase the productivity with appropriate ergotherapy programs.

The report prepared by the Turkish Ministry of Labor and Social Security stated that musculoskeletal system disorders caused by general ergonomic risk factors are reducing quality of life and work efficiency of the worker in the society as well as in working life (T.C. ÇSGB, 2007). In our study, ergonomic risk factors we assessed in the work environment of people with physical disabilities are related to many areas of quality of life. It was determined that 25 subjects (48.1%) were working in the unfavorable posture (with more than 20 degrees bent back or on the back) in terms of the back posture. In particular, the fact that improper positioning of the back of the worker can cause work-related musculoskeletal disorders. The poor working postures also found to reduce general health status perceptions and social functioning, cause pain, and cause a feeling of physical role weakness. Türkkan and his colleagues showed that bad work postures in the workplace cause particularly pain and loss of function and negative effects on social life as well as limitation of movement in individuals (Türkkan, 2009). The results of our study are also parallel to our study.

Due to the large number of risk factors that cause these disorders and leading to significant health problems, work-related musculoskeletal diseases have become a major public health problem. It has also become remarkable by the fact that it causes labor loss and economic loss. In order to be able to produce national initiatives to prevent inconveniences that may arise, the situation in the country must first be determined. Risks involved and work-related musculoskeletal disorders can be reduced by interdisciplinary work of nature of different sciences, which is an important dynamism in the area of occupational health (Türkkan, 2009) Disciplines who are interested in ergonomics, business tool makers and workplace organizers should work cooperatively to ensure proper posture and to ensure employee productivity (Colombini, et al, 2006 ; Türkkan, 2009; Kaygisiz, 2018).

Only three of the participants were risk free in an acceptable position when assessing risks to which upper extremities were exposed. The remaining were

found to be at high risk for upper extremity working posture. Musculoskeletal problems related to the upper extremity are frequently seen in occupational diseases in developed countries. In Europe, 45% of work-related injuries were musculoskeletal injuries related to the upper extremity. It is emphasized that ergonomic standards that respect human-machine and environment harmony must be adhered to in order to prevent these injuries (Colombini, et al, 2006). Among the diseases most frequently seen in recent years, which cause symptoms such as pain, discomfort, weakness, loss of consciousness and which are related to upper extremity, we can list Karpal Tunnel Syndrome, Trigger Finger, De Quervain Disease, Tennis Diverse and many other tendonitis and tenosynovitis (Colombini, et al, 2006; Türkkan, 2009; Kaygisiz, 2018). Participants working with high-risk upper extremities may lead to an increase in existing disability grades. It is possible to protect against musculoskeletal diseases that may occur in the workplace, education of ergonomics within the scope of occupational health and safety education, and appropriate regulation of working conditions in this direction (T.C. ÇSGB, 2007). It is once again emphasized that it is very important to undertake training and prevention studies to correct upper extremity work postures associated with almost all areas of quality of life.

The first step to reduce ergonomic risks in workplace and not cause a cumulative injury is to provide the required blood flow to the working tissues. Providing a sufficient blood flow of oxygen within the working tissues provides metabolic efficiency while helping to minimize the effects of tissue loading, fatigue and microtrauma. Providing a balance between work and human physiology to assist in the necessary blood flow is the key to preventing musculoskeletal disorders that can occur in the workplace (Jacobs, 1999). In addition to situations that cause physical wear, such as recurrent work activity, heavy workload, work activities that require static muscle contraction, work in bad posture and work in contact with bad surface, environmental factors also play an important role in the formation of work related discomfort. Vibration, excess or lack of heat, excess sound and insufficient light are among the most common environmental risk factors. How these factors affect the worker depends on the severity of these factors, the talents and skills of the person and the importance of the work done.

The burden on workers in production and service industries is increasingly. It is important to apply ergonomic programs to improve workplace health and safety, to improve comfort, morale and job satisfaction and to increase employee productivity (T.C. ÇSGB, 2007). In a study conducted by Pigini and colleagues in 2010, 16 patients with moderate to severe physical disability were assessed by ICF and various risk assessment methods. According to the results, workplace regulations were made, the ergonomic risk factors in the workplace were reduced, and then risk assessments were repeated in workplaces. Participants were found to work without risk by new regulations (Pigini, et al, 2010).

It is not right to link a musculoskeletal system injury that occurs in the workplace to a job, a posture, or a life style. Work related musculoskeletal diseases can develop due to many diseases or risks. In our study, the most common ergonomic risk areas are the risks associated with the most computerized work area, followed by the risks associated with musculoskeletal system loads and management, general workplace conditions, energy loads, environmental conditions, risks have been identified. Computer use, musculoskeletal and managerial issues are considered as the most risky subjects in ergonomic regulations and therapy programs. Many factors are associated with musculoskeletal disorders in computer users, and both physical and psychosocial factors increase the risk of workplace violence (Türkkan, 2009; Johnson, Jull, Soulvis, et al. 2010). Physical risk factors such as the length of time spent at the computer, the proper placement of the computer monitor, and the long-term use of the computer mouse have all been expressed by psychosocial factors such as supervisor support and decision-making arrangements. It has been reported that using both prevention strategies and treatment strategies in both physical and social terms yields more successful results (Johnson, et al, 2010).

Those related to the quality of life of employees in our study in general ergonomic risk areas were identified as general workplace conditions, musculoskeletal system loads and management related risks. The fact that musculoskeletal system loadings and management area are mostly related to social functioning and that general workplace conditions are related to mental health reveals that the quality of life is affected by mental health and social functions of participants. Results of general ergonomic risk analysis also showed that all body work posture risks were correlated with results of upper extremity

work posture risks and social function influence. Homa et al. (2007) stated that social treatment should not be neglected and that negative and discriminatory behaviors should be avoided even though individual treatment methods are applied to the persons. Researchers, however, argued that long-term improvements could be seen as a result.

When ergonomic risks related to management are evaluated, factors such as presence of control of employee on the job, tolerance share of the employer, communication with the employer, existence of critical duties and appropriateness of working and rest times are examined. Organizational effects in this context are among the risk factors associated with management. Associations with managers' employees are a source of social support and prevent negative pressure. In addition, aggressive production-focused situations, lack of support for employees and lack of performance monitoring can cause psychological pressure. As work pressure increases on the employees, person may be inclined to complete job by taking risks. As a result, the possibility of musculoskeletal disorders will increase (T.C. Çalışma ve Sosyal Güvenlik Bakanlığı, İş Sağlığı ve Güvenliği Genel Müdürlüğü- ÇSGB, 2007). The results showed increased management risks and their relevance to quality of life pointed to the importance of this issue and need to make arrangements in this regard.

Finger strength and grip strength of physically handicapped persons participating in the study were found to be significantly lower than normal values (Steultjens, Dekker, Bouter, et al, 2003). It is anticipated that the fingertip and grip strength of our study population, which uses the functions of the upper extremities in both daily life and work areas, is related to quality of life. It is suggested that these functions are further supported by ergonomics and physiotherapy programs, thus increasing the positive effects on quality of life. Finger and grip strength were found to be higher between the left and right in favor of the dominant side. Functional difference has emerged as a result of more use of the dominant side. It has been determined that 15 persons carrying loads from 0 kg to 20 kg were doing safe lifting and do not carry a risk of lifting force. The other 37 people were found to have no load on the job site they were working on. It is thought that other occupational areas that require lifting power in the risk group may need protective physiotherapy and ergotherapy approaches for the person and the environment.

The relation of finger strength, grip strength, lifting force and upper limb strength to the general health status perception of quality of life showed the importance of these parameters .during daily life It seems that those who participate in this study and those who need to have a good understanding of their work have influenced their perceptions of general health, physical role and energy / vitality. Steultjen et al. (2003) emphasized the importance of fine motor function in self-care, work and social activities. They pointed out that impairment in this function affected the person's daily life activities and therefore should be supported by a good physiotherapy and ergotherapy program.

The importance of lifting strength in functional capacity assessments has been proven by many studies (Gross and Battie, 2002; Ijmker, Gerrits and Reneman, 2003). In our work, the lifting strength of the people with physical disability has been found to be below normal values and there is a weak relationship between lifting force and physical functioning and general health status. Matheson et al. looked at the relationship between participants' lifting and grip strength and return to work (Matheson, Isernhagen and Hart, 2002). In the study, where 650 people were assessed, the performances of people lifting a box from the floor, lifting it on the head, and carrying it on a horizontal level were compared with the cases of returning to work. In this study, a good relationship was found between the amount of load lifted and the return to work (Matheson, et al., 2002). In our study, the lifting force was lower than norms and the association with quality of life was very low, suggesting that the participants had little need for lifting during work.

The high correlation of hip muscles with the physical function have been identified as an expected result due to the presence of antigravity muscles in the hip extensor and abduction movements. According to the walking phase, the contractions of the muscles around the hip and the load around the hips vary. In the stance phase, the hip abduction muscle contracts to stabilize the pelvis, and after the heel strike, the load is four times the body weight of the hip and the body weight seven times the body weight immediately before the finger lift. At the same time, the fact that most of the hip circumference muscles outside the external rotation are related to the social function perception of the quality of life suggests that physical functions also affect social functions (The National Institute for Occupational Safety and Health- NIOSH,

1997).

In upper extremity muscle strength assessments, wrist supination, forearm supination and shoulder strength were found to be associated with energy / vitality and general health parameters of the strength of life quality. The widespread use of wrist extension, which functions as a stabilizer in the daily life, is thought to affect the general health parameters of the quality of life (NIOSH, 1997). Two reasons that the forearm supination is the second most frequently used upper extremity movement and shoulder extension movement working against gravity may explain the association of these muscles to general health parameter.

It has been observed that people with physical disabilities working as a result of our work are working in high-risk environments and in harmful postures, but these high risks are associated with only some parameters of life quality. In our study, it was determined that both some parameters of working capacity and ergonomic risk factors were related to some parameters of life quality. These results suggest that the effects of individual hypotheses on the quality of life are examined separately, but that the factors belonging to the person and the environment must be evaluated together in order to ensure that the quality of life develops in all areas. More research is needed to investigate the relationship between working capacities and ergonomic risk factors.

Limitations

Workplace risk factors of people with physical disabilities are assessed. The general ergonomic risk analysis checklist, OWAS and RULA assessments all included physical components. The result of our study shows that functional capacity and ergonomic risk factors in the workplace affect the perception of social function as well as the perception of physical function of quality of life. We consider that the evaluation of ergonomic risk factors socially in the future studies will further contribute to the explanation of the parameters of quality of life.

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