

ERGONOMIC EVALUATION OF A PEDAL OPERATED CASHEW NUT SHELLER

^aS. K. Swain, ^bJ. P. Gupta, ^cS.K. Mohanty and ^dP.K.Sahoo

^aProgramme Coordinator, Krishi Vigyan Kendra, Mayurbhanj, Shamakhunta, Orissa, India

^{b,d} Faculty of Agricultural Engineering, Bidhan Chandra Krishi Viswavidyalaya,
Mohanpur, Nadia, West Bengal, India

^cAICRP on Ergonomics & Safety in Agriculture, College of Agricultural Engineering &
Technology, Bhubaneswar, Orissa, India.

Email: swainsangram@yahoo.co.in

Abstract

Cashew Nut shelling in India is primarily accomplished by conventional hand beating method, which involves human drudgery apart from the remarkably poor quality control standards. A pedal operated cashew nut sheller was developed incorporating a new shelling mechanism adopting the principle of impulse and tension. The ergonomic evaluation of the pedal sheller was conducted and compared with the conventional hand beating method considering different physiological parameters like heart rate at rest (HR_{Rest}), heart rate at work (HR_{work}), Work pulse (WP), heart rate per nut and subject rating scale like Overall Discomfort Rating (ODR) and taking six male and six female agricultural workers in the age group of 20-40 years.

The mean value of heart rate at work was recorded to be 128.1 and 128.0 bpm for male and female workers in pedal operated sheller against 98.9 and 92.3 bpm for male and female workers in beating method. The WP for all subjects in conventional method and pedal operated sheller were observed to be 24.3 and 56.6 bpm respectively. The results indicated that the pedal sheller was not ergonomically superior to the conventional method because of the shelling operation being accomplished through a downward force of 63 kg by the operator. But the output of pedal sheller was observed to be 3.56 kg/h (12.25 nuts/min) as compared to 2.87 kg/h (9.7 nuts/min) in conventional hand beating method.

Thus, it was suggested that in order to increase the capacity of shelling further and making the newly developed sheller ergonomically efficient, the pedal sheller could be modified to be operated by an external power source (electric motor) basing on the same principle of impulse and tension by incorporating suitable mechanisms.

Key words: pedal sheller, heart rate, work pulse, overall discomfort rating, out put.

**DESIGNING BODYSTORMING SIMULATORS FOR
ERGONOMIC STUDY OF DESIGN ENVIRONMENTS**

Amitoj Singh

Assistant Professor, Industrial Design Programme

Indian Institute of Technology, Delhi

Email:amitoj_design@yahoo.com

Abstract

This paper highlights the role of “bodystorming” in design education. The paper presents the series of bodystorming exercises conducted by 20 design students at IIT Delhi as a part of the course on “Applied Ergonomics”.

The findings of the study lead to the development of four bodystorming simulators developed with the support of Max Healthcare. The paper explains the significance of bodystorming in design of human centred products, services, systems and infrastructure.

A collaborative model for healthcare design and innovation is proposed based on the findings of the study.

Keywords: Bodystorming, Design, Simulators, Healthcare

WORK POSTURE ASSESSMENT IN FORGING INDUSTRY: AN EXPLORATORY STUDY

L P Singh ^[1], Atinder Singh ^[2], Bhardwaj A ^[3] and K.K. Deepak ^[4].

^{[1], [2] & [3]} Department of Industrial & Production Engineering,

Dr B R Ambedkar national Institute of Technology, Jalandhar, Punjab, (India).

^[4] Department of Physiology, All India Institute of Medical Science,

New Delhi, (India).

Email: a_josan4u@yahoo.co.in

Abstract

Musculoskeletal disorders (MSDs) are common health problem throughout the world. Assessment of exposure levels to MSD risk factors can be an appropriate base for planning and implementing interventional ergonomics programs in the workplace. Present study conducted on posture analysis of the workers working in a forging industry. Study conducted on 130 workers of a forging industry using the posture analysis tools RULA, REBA and OWAS. A video showing the different activities of the workers was shot and then images were cropped from it for the analysis.

The results of REBA showed that about 10.65% of the workers were under very high risk level and needed a necessary action immediately. About 30% of the workers were under high risk levels and about 10% of the workers were at lower risk levels. The study also showed that about 46% of the workers were at medium risk levels and required a necessary action. The results of RULA showed that about 30% of the workers were under high risk levels and required immediate change. About 33-38% of the workers were at lower risk levels and 32-33% of the workers were at medium risk levels. According to the OWAS method of analysis, the study showed that 56.15% of the workers were fine and needed no corrective measures. About 23.85% of the workers needed corrective measures in the near future and 19.23% of the workers required corrective measures as soon as possible.

The study concluded that in small scale industries casting and forging ergonomics is simply missing and a large number of the workers are working in very bad postures. Thus the workers are at high risk of Musculoskeletal disorders (MSDs). Study recommended for imparting awareness and proper ergonomics training to the workers.

Keywords: Musculoskeletal disorders, RULA, REBA, OWAS

**ASSESSMENT OF OCCUPATIONAL NOISE EXPOSURE AMONG
TRAFFIC POLICEMEN WORKING IN KOLKATA CITY**

Manoj Kumar Sarkar and D. Banerjee
Production Engineering Department,
Jadavpur University, Kolkata – 700 032,
Email: www.mksarkar@yahoo.co.in

Abstract

This paper studies occupational noise exposure of traffic policemen in Kolkata city, India. The most negative effects caused by noise exposure are related to the hearing system and may produce temporary threshold shift or even permanent deafness. The objectives of this study were to determine equivalent sound level, sound exposure level, 8 Hour projected dose, time weighted average level and peak exceedance level of noise exposure to traffic policemen using a precision dosimeter.

Twenty four traffic points in Kolkata city were selected where traffic policemen were on duty and measurements have been carried out from July 2009 to September 2009. Data on self-reported health status was collected from traffic policemen by questionnaire. About eighty five percent of the traffic policemen reported hearing difficulty.

Noise data recordings from different traffic point were used for statistical analysis and they have been compared with the limits imposed by the different current regulations.

Keywords: Occupational noise; Dosimeter; Traffic policemen

ADDRESSING ERGONOMIC CONCERNS THROUGH SAFETY**LEGISLATION – A GAP ANALYSIS**

Nagarajan Periyar¹ and Rauf Iqbal²

¹ Research Fellow, National Institute of Industrial Engineering, Mumbai, India

² Assistant Professor, National Institute of Industrial Engineering, Mumbai, India

Email: nagarajan.periyar@gmail.com

Abstract

The interaction between man, machine and environment in the presence of stresses like, psychological stress, mechanical stress and environmental stress – may well lead to workplace accidents- if the stresses are not fully removed from the work place situation. Identification of all such stresses and finding workable solutions to them will help in preventing workplace accidents and safeguarding workers' health.

In order to safeguard the workers against accidents and ill health, a large number of safety legislations exist in India. Notable among them are the Factories Act, 1948; Dock Workers (Safety, Health and Welfare) Act, 1986; Building and other Construction Workers (Regulation of employment and condition of service) Act, 1996 etc.

These legislations stipulate that safety, health and welfare measures to be provided in the respective areas, namely, factories, docks and construction sites. However, the ergonomic factors concerning safety are not adequately addressed in these legislations. While environmental factors such as noise, ventilation, illumination etc. have been dealt in detail, the factors relating to interaction between man and machine need more emphasis in the legislation.

The present study attempts to bring out the gaps in the statutory requirements of various legislations in general and the three acts mentioned above in particular. The findings of the gap analysis will help the law makers in bridging the gap in future amendments.

Key words: Safety, Factories Act, Dock Workers Act, Construction Workers Act, Ergonomics.

USABILITY FACTORS IN INFORMATION SYSTEMS DEVELOPMENT

Chandra Sekharaiah K.¹ Radha Krishna A.² Atmaram K.³ Sai Kumar K.⁴

Computer Science & Engineering, Jawaharlal Nehru Technological University, Hyderabad.
He is FIE, FIETE, FSESc., FIAHP, SMCSI, MISE, MISCA, MAMPI, MISTE, MNAoP.

² Computer Science, V.S.Lakshmi College of Engineering, Kakinada, Andhra Pradesh and is a Ph.D. scholar with the first and the fourth authors as the research advisers.

³ Computer Applications in Hindu College, Guntur, Andhra Pradesh and is a Ph.D. scholar with the first author as the research adviser.

⁴ Dept. of Management, Narayana Engineering College, Nellore, Andhra Pradesh.

Email: vasjrs2004@yahoo.co.in

Abstract

Computers have become a commonplace technology for today's man. Computer users demand more reliable and durable interfaces from information processing applications developers. Information systems (ISs) research and development, over the years, has been steady so well that the arena has now grown into various subfields such as Cognitive Information Systems (CISs), Web Information Systems(WISs), Geographical Information Systems(GISs), Enterprise Information Systems (EISs), and so forth.

Of late, ergonomics specialization too has begun to percolate into the field making it more cross-fertilizing with concerns for successful deployment, a win-win model of development and look-and-feel factor in terms of durable usage and usability.

The paper presents a novel taxonomy of computer ergonomics and the Human-Computer Interaction (HCI) factors in information systems development with regard to the aforementioned subfields of ISs.

Keywords: Human-Computer Interface, Information System

AN ERGONOMIC ASSESSMENT OF THE LIBRARY WORK STATION DESIGN IN RELATION TO THE EMPLOYEES' MUSCULOSKELETAL HEALTH HAZARDS

Suhana Ghosh, Sangita Barman, Somnath Gangopadhyay and Ananga Mohan Chandra

Department of Physiology, University College of Science and Technology,
University of Calcutta, India

Email: suhana81@rediffmail.com

Abstract

The present study was aimed to evaluate the ergonomic issues in libraries in relation to the employees' musculoskeletal health and overall satisfaction about library services. Fifty (50) academic libraries and 150 male library employees were selected for this study.

The questionnaire study revealed that the employees were suffering from musculoskeletal pain at different body parts (e.g. neck, back, etc.) and in some cases the pain was severe. The questionnaire analysis about library services showed that most of them were not satisfied with some of their workstation factors (e.g., space, furniture etc)

Keeping in view the employees' responses a thorough assessment of the library workstation has been done which include assessment of the library furniture (e.g. chair, table, book stacks etc) and environmental condition (illumination, sound etc.)

The observations have shown that all the furniture like chairs, book stacks were of fixed variety and couldn't be adjusted as per the requirement of the employees' body dimensions leading to their musculoskeletal stresses. The results also revealed that the illumination levels of the libraries were lower and sound levels and temperature were very higher than their recommended standard.

From this study it may be concluded that the libraries must be modified following the principles of ergonomics to ensure health, safety, productivity and satisfaction of the employees.

Keywords: library employees, ergonomics, musculoskeletal stress, workstation factors

A COMPARATIVE STUDY ON HEARING SENSITIVITY BETWEEN RURAL AND URBAN HIGH SCHOOL STUDENTS

Md. Warish¹, Debasish Nandy², .Ananga.Mohan Chandra³ and Amalendu Samanta⁴

¹ Research Fellow, Department of Physiology, University College of Science and Technology (U.C.S.T), University of Calcutta, 92, APC Road, Kolkata-700009

² Ex-student, Department of Physiology, U.C.S.T

³ Professor, Department of Physiology, U.C.S.T

⁴ Guest Lecturer, Department of Physiology, U.C.S.T

Email: mdwarishergocu@gmail.com, mdwarishergocu@yahoo.com

Abstracts

The study was conducted to investigate the influence of traffic noise on the function of auditory system of school - age children. A total 114 student attaining school in urban area and 120 student attaining school in rural area were included in this study. The age for both the group of student varied between 9 to 17 years. The average noise level of urban area was observed to be varying between 68.4 to 112.8 dBA where as in case of rural area it varied from 51.2 to 84.2 dBA.

The result of the audiogram show a shift of hearing threshold more at lower frequency than higher frequency but there was dept at 4 KHz .the result of the audiogram in this study revealed the prevalence rate of hearing loss was more in higher age group (57.14%) compare to younger age group (15.52%) though the severity rate was mild in nature as per WHO guide line.

These occur only in urban student but totally absent in case of rural student. In summary the degree of auditory damage coincided with noise.

Keywords: school children, traffic noise, noise inducing hearing loss.

RISK FACTORS IN OCCUPATIONAL HAND INJURIES

Maryam Maghsoudipour and S. Ali Hosseini - Zohre Sarfaraz

University of Social Welfare and Rehabilitation, Iran

Email: sahosseini@uswr.ac.ir

Objectives: The aim of this study was evaluation of occupational and non-occupational risk factors in workers with occupational hand trauma.

Methods: It was designed as a case control study. Ninety industrial workers with occupational hand injury were selected randomly from Tehran nearby factories. Eight cases were excluded from the study. Eighty-two cases and 83 controls matched for age, gender and also occupation, were included in the study. Working circumstances were assessed using a detailed occupational questionnaire as well as non-occupational factors. The questionnaire was filled for any of cases and controls. Multivariate logistic regression model was used to test the association between occupational and non-occupational factors and hand injury.

Results: Risk factors for occupational hand trauma were rotational shift work, working in the early hours in the morning, working alone; and protective factors were availability of safety equipment or having the implement equipped by safety tools, Safety education and using safety equipment. Adjusted for confounding factors, protective factors were availability of safety equipment or having the implement equipped by safety tools and the risk factor was working alone.

Conclusion: Some occupational factors are protective and some are risky for occupational hand injury. By modifying these factors we may decrease occupational upper extremity accidents.

Keywords: hand injury, occupational, shift work, safety equipment

**THE IMPACT OF PHYSICAL WORK EXPOSURE ON MUSCULOSKELETAL
PROBLEMS AMONG TRIBAL AND NON-TRIBAL WOMEN OF UDAIPUR DISTRICT**

Nidhi Suthar* and Vandana Kaushik**

Department of Family Resource Management, College of Home Science,
MP University of Agriculture and Technology, Udaipur, Rajasthan, India
E-mail: * n_jangid@rediffmail.com ** vandana_kaushik1@yahoo.co.in

Abstract

Work related musculoskeletal disorders are group of painful disorders of muscles, tendons and nerves. Work activities which are frequent and repetitive or activities with awkward postures cause these disorders which may be painful during work or at rest. In the home and farm where women perform tasks in awkward sitting, standing, bending, twisting postures, duration of work and inadequate rest pause are associated with occurrence of serious musculoskeletal problems and musculoskeletal disorders.

In the current study, a sample of 60 rural women comprising of 30 tribal (Tribal) and 30 non tribal women was selected to draw the results. Incidence of musculoskeletal symptoms, information on causes of pain, work load and severity of pain were assessed by self structured questionnaire and body map technique.

Results showed that work related musculoskeletal problems and disorders affect the various joints of arms, shoulder and back. While the work using the legs can lead to musculoskeletal disorders of the hip, knees and calf muscles.

Keywords: tribal women, work related musculoskeletal disorders, awkward postures

**USER CENTERED DESIGN INPUT IN MECHANICAL ENGINEERING AND DESIGN:
ERGONOMICS RELEVANCES**

Prakash Kumar^a and Debkumar Chakrabarti^b

Ergonomics Laboratory, Department of Design, Indian Institute of Technology Guwahati,
Guwahati 781039, Assam, India,

Email: ^a pk.kumar@iitg.ernet.in, ^b dc@iitg.ernet.in

Abstract

Ergonomics embraces most of the human related considerations (physical and mental) taken into account while designing different products and system interfaces for effective use. In the present era of user centeredness and market competition, ergonomic considerations are the must as the users are no more bound to cope up with whatever design being imposed on them.

In addition, it has significant implication in all the domains of engineering sciences and specifically mechanical engineering. Being a core engineering branch, it include not only the design of machine and equipment, but also concerned with the manufacturing processes of products. Be it design and manufacturing of big machines or different components of a system, the basic user compatibility features has to be followed. To ensure functional efficiency, the aspects of human interaction are the most critical factors to be considered. Therefore, inclusion of relevant introductory ergonomics input to the domain specific undergraduate technology programmes is necessary.

In support of advocating the above need, this paper expresses the views and experiences of the students of Post Graduate Design Program at IIT Guwahati. Had an initial input been given in undergraduate programmes, it would help to go indepth during design discipline specific postgraduate applications. This paper explains some design concerns dealing with mechanical engineering aspects where design ergonomics plays an important role in creating trustworthy effect.

Keywords: Ergonomics input, Engineering, User Centeredness

**ANALYZING DIFFERENT PREVENTIVE INTERVENTIONS IN REDUCING THE
WORKSTYLE RISK SCORE IN COMPUTER OPERATORS**

Smita Sharma*, Dr. Pavas Jaiswal**, Dr. Shobhit Saxena***

*Student-MPT-Musculoskeletal, **HOD-Physiotherapy & Asst. Professor, ***Lecturer in
Physiotherapy, Faculty of Applied Sciences, Manav Rachna International University,

Faridabad (Haryana)

Email: smita204@gmail.com

Abstract

Despite knowing the fact that ergonomic counseling prevents musculoskeletal disorders, no published study till date has evaluated workstyle quantitatively.

The purpose of this study is to measure work style of computer professionals and providing a feedback to employee and employer to stimulate their work station, workstyle and reduce the psychological stress by developing coping behavior with regards to high work demands, in order to make work station fit for the person. The study aims to evaluate the workstyle and studying the effect of two preventive interventions in reducing the workstyle risk score.

A randomized controlled trial of 8 weeks is being carried on with 60 subjects who were sedentary computer operators with risky work style. Persons with any medical conditions or undergoing any sort of vigorous medical treatment and who have already taken any kind of prior ergonomics counseling have been excluded from the study. Subjects were randomly divided in three groups i.e. Group A received ergonomic intervention, ergonomic brochure, and physical activity, Group B has given ergonomic brochure and physical activity, and Group C has only received physical activity. Stair climbing is used as physical activity, common to all groups. The outcome measures were Workstyle Short Form, RULA scale, and Cornell Musculoskeletal Questionnaire. Results are awaited.

Keywords: Ergonomics training, Work style Short Form, Cornell Musculoskeletal Questionnaire, RULA .

**A METHOD FOR STUDY OF GRASS ROOT WORKERS IN ORDER TO DESIGN
WORLD CLASS PRODUCTS: THE CASE OF
RICKSHAW PULLERS IN NORTH INDIA**

Ali Haider Rizvi, Sumit Singh

Department of Industrial and Production Engineering,

Dr. B.R. Ambedkar National Institute of Technology, Jalandhar, Punjab, 144011

Email: ali.h.rizvi@gmail.com

Abstract

Researchers and home scientists have for long faced a problem of quantifying the data received from grass roots workers in order to help them create new products for the aforementioned workers. This paper presents a method to utilize a modified Nordic questionnaire, along with REBA and Borg CR10 scale in order to quantify exact design requirements of the workers, and presents a case study done using the methodology in Rickshaw workers in North India. As the tests were originally developed using educated people from developed countries as subjects, it becomes difficult to administer these tests on uneducated people, especially the people of India, for whom certain important ergonomic terms do not even figure in their local dialects.

Thus, a method was developed to make these questionnaire more 'India Centric', which would allow researchers and designers to utilize them to quantify data received from uneducated workers, and allow the workers to present their thoughts more lucidly.

The framework was then administered on rickshaw pullers in one sitting and the results were compared with results obtained from various structured interviews. The tests were optimized using Artificial Intelligence to allow them to be administered at a faster speed, allowing greater number of subjects in a single time span.

The methodology used in this paper can be immensely useful to other scientists, as it can be easily used by them to design tools and implements for the uneducated of developing countries.

Keywords: Rickshaw workers, Nordic questionnaire, REBA, Borg CR10 scale,

**A COMPARATIVE STUDY OF BODY COMPOSITION OF URBAN SCHOOL
GIRLS OF DIFFERENT SOCIO-ECONOMIC STATUS**

Anurupa Sen*, Debamita Kilikdar, Ashis Ghoswami and A. M. Chandra¹

Ergonomics and Sports Physiology Laboratory, Calcutta University

92 A.P.C Road Kolkata- 700009

Email: anurupa_sen2006@yahoo.co.in

Abstract

The present study was conducted to assess the effect of nutrition on body composition of school going girls from different socio-economic status.

A total of 50 female students (9-15 years) from two urban schools were randomly selected and they were classified according to Kuppuswamy scale of socio-economic status. A questionnaire method was followed to determine the nutritional status of the families of both schools. The anthropometric and skin fold measurements were taken for the computation of body composition.

Despite the low energy consumption by the lower economic groups, no significant difference was found in the body compositions of girls of 9-10 years of age. But in case of 11-12 years of age group the skin fold thickness (mm), body fat %, fat mass (kg) and % muscle mass were found to be significantly higher ($P < 0.05$) in the upper economic class than that of the lower socio-economic class. Likewise, all the parameters of the 2 groups except age (years) and height (cm) were found to be significantly higher in case of 13-15 years age group of students ($P < 0.05$).

The study clearly reveals that the socio-economic status has a positive influence on the body composition. The difference is prominent in the post-pubertal age which signifies that these females require appropriate nutrition for proper growth and development. Future studies will throw some light on the influence of nutrition on the growth pattern of the school going female students.

Keywords: Socio-economic status, female students, body composition, anthropometry, nutrition

MEASUREMENT OF COMPRESSIVE FORCES ON L5-S1 JOINT AS AN INDEX OF LIFTING RELATED HAZARDS OF THE LOAD BEARER OF THE FISH MARKET

P. Bandopadhyay, D.Sen, Alak.kr.Syamal and S.Ghosh.

Ergonomics Laboratory, Department of Physiology, Presidency College, Kolkata

Email: alak_syamalpresi@yahoo.co.in

Abstract

Ergonomics mainly focuses on "Fitting the job to the man" concept. Therefore work related injury and potential risk from the work environment is the matter of subjective concern in an unorganized industry where no fixed work schedule, hazardous environment of work and least safety to the worker at work place sometime causes life threatening situation for the worker. The basic objective of the study is to observe whether (1) development of low back pain & upper back injury (shoulder & neck) has got any relationship with methods of lifting and (2) Assessment of hazards during manual operation of load handling by calculation of compressive forces at L5-S1 joint (Chaffin 1975).

Sixty (60) male subjects were randomly selected at the "Fish Market" who were mainly involved in loading and unloading of fish crates (Weight 68-70Kg roughly and for the period of 8-10hrs) was divided into two groups (n=30) based upon the age and work experience. The Lifting Index (LI) was calculated using Revised NIOSH Lifting equation (Waters, Putz-Anderson, Garg 1993) and Compressive forces at L5-S1 Joint was calculated using "simple cantilever low back model of lifting" (Chaffin 1975).

Significant Correlation coefficient value was observed between Lifting Index & Compressive Force ($p > 0.001$ at $df = 13$) in both the groups. Correlation value between Shoulder Pain and Disability Index (SPADI) (Williams JW Jr., Holleman DR Jr., Simel DL) with Lifting Index & Compressive Force (at L5-S1) joint in both the groups is also high ($p > 0.001$ at $df = 13$). Moreover paired t-test shows no significant difference of LI & Compressive Forces (at L5-S1) between two groups which reflects carriage of heavy load and improper lifting are the causative factors for lifting related injury and needs immediate attention in this sector of work.

Keywords: Compressive Force, Lifting Index, Shoulder Pain and Disability Index (SPADI), Hazard, Injury.

**STATIC SITTING ANTHROPOMETRIC CHARACTERISTICS OF 11-16 YEAR AGED
BENGALI MALE STUDENTS LIVING IN KOLKATA.**

Raghwendra Mishra¹, Sukhamoy Dhabal², Debasish Sen², Alak Kumar Syamal²

¹. Department of Neonatology, Institute of

Post Graduate Medical Education & Research & SSKM Hospital, Kolkata.

². Division of Ergonomics and Work Physiology, Department of Physiology,
Presidency College, Kolkata.

Email : alak_syamalpresi@yahoo.co.in; r_mishra82@yahoo.co.in

Abstract:

School children are one group who appear to be particularly at risk because of the wide range of body size, the prolonged seated posture and the possible adverse developmental effects of prolonged exposure to postural stresses. Studies on seating furniture has revealed that the mismatch between school furniture and body size as a causative factor for musculo-skeletal disorders and low back pain amongst school students. This study examined the static sitting anthropometric characteristics of Bengali male students within the 11-16 year group, which are useful for designing furniture.

A total of 120 Bengali students, 20 from each age group, were randomly selected from different schools in Kolkata for this study. To determine the static sitting anthropometric characteristics a total of 18 measurements were made on the right hand side of each individual.

The results obtained were subjected to statistical analysis and presented in table form as the mean, standard deviation, 5th and 95th percentile values according to age, which will be helpful for designing of the classroom furniture.

Key Words: Static, Sitting, Anthropometry, Bengali, Students.

OCCUPATIONAL FACTORS ASSOCIATED WITH LOW BACK**PAIN IN KOLKATA BUS DRIVERS, INDIA**

Samrat Dev¹, Tarannum Ara¹, Goutam Ghoshal¹, Tamal Das¹, Amitava Kar²

and Somnath Gangopadhyay¹

¹Occupational Ergonomics Laboratory

Department of Physiology

University College of Science and Technology

University of Calcutta

²Deptt of Human Physiology, Women's College, Agartala

Email: samrat30@rediffmail.com

Abstract

Work-related musculoskeletal disorders (WMSD) affect workers in many occupations including drivers of large vehicles. Public Buses in India are large road vehicles, since these buses constitute the backbone of the local transportation for the common man in the city. Consequently many people are engaged as bus drivers.

The present study was undertaken among 110 randomly selected male bus drivers from five different routes. To assess the conditions of the bus drivers the modified Nordic musculoskeletal questionnaire included questions on work, musculoskeletal complaints and perceived occupational risk factors associated with each discomfort. Physical assessment consisted of measurement of height, weight, handgrip strength, sit-and-reach test, and observation of sitting postures. Twenty drivers were observed during their service route driving (at least one complete round trip).

The results showed that city bus drivers spend about 16-18 hours daily for continue of 15-20 days, often with the torso straight or unsupported, and experience discomforting shock/jerking vibration events. Because of all this condition they suffered from extreme physiological stress and low back pain due to prolonged working hours and excessive work pressure. Consequently all these factors affected their health and work performance.

Key words: Bus; Drivers; Exposure; Posture; Low back pain

**THE COMPARISON OF SKILLED HUMAN LABOR AND MACHINES:
A CASE OF SUBMERGED ARC WELDING**

Ankit Saxena and ALI .H. Rizvi

Department of Industrial and Production Engineering,
Dr. B.R. Ambedkar National Institute of Technology, Jalandhar, Punjab, 144011

Email: ali.h.rizvi@gmail.com

Abstract

Submerged arc Welding is a recent development in the world of industry. It has been touted for its large production volumes and quality. However, the cost of the machine is prohibitive; and leads at high levels of unemployment. In this study, we seek to check whether manual methods, which are cheaper provide greater flexibility and accuracy or not.

Method: We compare the results obtained to develop a complex product using both, automatic SAW and manual welding methods. In this we check for different process variables and quality parameters such as electrode polarity ,electrode angle ,flux depth, arch voltage, welding current ,welding speed, bead size ,bead shape, depth of penetration using Brinell Hardness Test including tensile strength using Universal Testing Machine. We then check the ergonomic cost to the worker while he is doing the welding. The overall comparison is then conducted and a factor analysis done using Analytical Hierarchal Processing (AHP), to determine the best suited method, and to also determine the cost this method will have on the workers in the factory.

Relevance to Industry: With many industries unsure about their future expansion problems, and with workers facing newer health hazards everyday, this study gives the managers a introspective view of how to tackle this problem within their companies.

Keywords: musculoskeletal disorder, submerged arch welding, cafer

COMPUTER ERGONOMICS: SOFTWARE AND HARDWARE — A SURVEY

Chandra Sekharaiah K.¹ Radha Krishna A.² Atmaram K.³ Sai Kumar K.⁴

⁵ Computer Science & Engineering, Jawaharlal Nehru Technological
University, Hyderabad

² Computer Science, V.S.Lakshmi College of Engineering,
Kakinada, Andhra Pradesh

³ Computer Applications in Hindu College, Guntur, Andhra Pradesh

⁴ Dept. of Management, Narayana Engineering College,
Nellore, Andhra Pradesh.

Email:ark1967@rediffmail.com

Abstract

Emerging technologies of computer systems and accessible interfaces harness the computer power based on progressively ergonomic concerns for durable deployment and usability as the computing community have realized the futility of pursuing mere structural, functional, algorithmic, artistic expertise for design modeling and have turned sensitive to human capacities, needs and performance.

In this paper, various deleterious effects of non-ergonomic usage of computer systems are presented. Human-factors principles and processes to be considered by the applications developers for producing effective interactive systems are presented. Cognitive and affective issues of concern to computer ergonomics are also presented.

Keywords: ergonomics, human capacities, cognition, design

**NOISE EXPOSURE AND NOISE INDUCED HEARING LOSS OF
FOUNDRY WORKERS IN INDIA.**

Samanta. Payel*, Gangopadhyay. P.K **and Chandra. A. M.***

*Research scholar, Dept of ROHC, Eastern, Kolkata and Dept of physiology,
University College of Science, Kolkata

**Scientist F, ROHC, Kolkata

***Professor of Physiology, University College of Science, Kolkata

Email: payeltania@gmail.com

Abstract

Hearing loss induced by noise exposure in two foundries (no of works: 56) in India was investigated on the basis of interviews, noise measurements, audiometric tests.

The frequency of subjective symptoms in relation to noise exposure was more in workers in chipping operation than among other workers and control groups. The average noise dose to which the workers were exposed over the work shift exceeded the recommended limit proposed by Indian Factory Act1948 as well as OSHA of US Dept of Labor.

The result of audiometry measurements indicated that hearing ability was reduced significantly of all categories of workers except crane operators. Values of pure tone average, high pure tone average and threshold at 4KHz were all higher in workers belonging to all categories except crane operators. Among workers with hearing loss(>25 dBA) in either low (.5-2KHz) or high frequencies (3-6KHz), tinnitus, fullness in ears were the most common symptoms followed by speaking loudly. Baring crane operator, hearing impairment progressed with age, duration of exposure with a dip at 4000Hz.

It was concluded that the degree of hearing loss in the works under study was serious and noise prevailed in this workplace was certainly associated with hearing impairment of the workers.

Key word: Pure tone average, high pure tone average, hearing impairment

A COMPREHENSIVE FRAMEWORK FOR BIOMECHANICAL MODELING OF MANUAL MATERIAL HANDLING TASKS

Ratri Parida and Pradip Kumar Ray

Department of Industrial Engineering and Management

Indian Institute of Technology Kharagpur

Kharagpur 721 302, India

Email: ratri@iem.iitkgp.ernet.in

Abstract

Although minimization of manual labour through mechanization and automation of industrial jobs may be desired, manual material handling in industrial jobs are unavoidable in developing countries like India. A number of approaches, within the domain of biomechanical modeling, are proposed and applied for improved ergonomic design of such jobs. However, analysis of manual material handling jobs with the consideration of functional or dynamic, and Newtonian anthropometry of the persons in actual working conditions is a critical research need in the pursuit of ergonomic design improvement of material handling tasks. In this paper, literature pertaining to the above-mentioned aspects are briefly appraised and a comprehensive research framework is developed.

In this research framework, the details of input variables, such as job characteristics, level of manualness, work environment, and extent of anthropometric match or mismatch and parameters in respect of biomechanical and physiological aspects, such as energy expenditure, and level of fatigue pertinent to different kinds of manual material handling jobs are identified and included. This research framework results in development of a comprehensive and generic methodology for biomechanical modeling of moderate to heavy work under diverse work environment.

The details of work-related issues, work-specific data and analytical or experimental approaches suggested are highlighted in the proposed framework. The potential benefit lies in its developing guidelines for designing such jobs with minimization of risk of fatigue, physical stress, and musculoskeletal disorders which enhance safe methods of working in industries involving manual handling tasks.

Keywords: Manual material handling, Body posture, Biomechanical analysis, energy expenditure, ergonomic design

EFFICACY OF OFFICE ERGONOMICS TRAINING: AN EVALUATION AND COMPARISON OF INSTRUCTOR, COMPUTER AND WEB-BASED TRAINING

Shikha Arora*, Dr.Pavas Jaiswal**, Dr. Unaise A Hameed***

*MPT-Musculoskeletal student, **HOD Physiotherapy & Asst. Professor, ***Lecturer in
Physiotherapy, Faculty of Applied Science, Manav Rachna International University,
Faridabad (Haryana)

Email:shikharora@gmail.com

Abstract

Office ergonomics training serve as a powerful means of enhancing organizational effectiveness through improving worker's health and well-being. When a successful office ergonomic program is implemented, the result is an increased ability for the workers to perform his / her job in a healthful, safe manner.

The objective of this study is to evaluate the effectiveness of office ergonomics training using Kirkpatrick model delivered through instructor, computer and web-based media and to ascertain which medium is more effective at increasing knowledge, changing behavior and precipitating reactions to the training. Using a methodology popularized by Kirkpatrick, this investigation focused on the effects of the training delivery methods for knowledge, behavior, and reaction to training.

It is an experimental prospective comparative study. Office workers are assigned to one of three study groups: Group A receiving the Instructor based training ($n=15$), Group B receiving computer based training ($n=15$), and Group C receiving Web based training ($n=15$). A pre / post-training knowledge test was administered to all those who attended the training. Body postures being observed before and after the training. As a method for comparing results, data is being collected for both the knowledge and the behavior prior to and post -training delivery. Data for reaction to training shall be collected post training. This investigation shall use intra -group, inter -group, gain -score comparisons between pre and post -training data for three training delivery methods. The results of the study are awaited.

Keywords: Office ergonomics training, Reaction, Knowledge, Behavior, RULA

INFLUENCE OF NUTRITIONAL STATUS ON MUSCULOSKELETAL DISORDERS OF WOMEN ENGAGED IN STONE CRUSHING JOBS

Sujata Goswami, Sujaya De and Prakash C. Dhara

Ergonomics and Sports Physiology Laboratory,
Department of Human Physiology with Community health,
Vidyasagar University, Midnapore-721102, West Bengal, India
Email: prakashdhara@rediffmail.com

Abstract

The present study was aimed to evaluate the musculoskeletal disorder (MSD) of women workers engaged stone crushing and to assess the possible influence of nutritional status on the occurrence of musculoskeletal disorders.

The study was conducted on 145 women stone crushers in 10 stone crushing workstations located at Purulia district in West Bengal. The musculoskeletal disorder was evaluated by modified Nordic questionnaire. The nutritional status was evaluated by 24 hours recall technique. Different anthropometric measures, viz. height, weight, wrist-hip circumference were taken and body mass index and waist-hip ratio were also computed.

Results showed that a very high percentage (87%) of women workers reported pain in lower back. The MSD was also prevalent in neck, upper back and knee. The subjects were divided into two groups according to the WHO prescribed BMI cut off values, viz., well nourished (BMI = 18.5-24.99) and under nourished (BMI <18.5). It was noted that the occurrence of MSD in undernourished group was higher than that of well nourished women workers. Chi square test revealed that the frequency of occurrence of MSD was significantly different in cases of shoulder, neck, upper back, hip, knee and ankle between two groups. The mean body weight, BMI and waist circumference were significantly lower ($p < 0.001$) in undernourished women. The mean energy, protein and carbohydrate intake was also significantly lower ($p < 0.001$) in undernourished workers than the well nourished worker.

It may be concluded that the nutritional status may have an influence in the occurrence of MSD among stone crushing women workers.

Keywords: Nutritional status, musculoskeletal disorders, stone crusher, women

**ASSESSMENT OF OCCUPATIONAL HEALTH PROBLEMS AMONG
THE PART-TIME HOUSEMAIDS OF WEST BENGAL, INDIA**

Rapti Das, Tamal Das, Goutam Ghoshal, Taranum Ara, Samrat Dev,
Somnath Gangopadhyay

Occupational Ergonomics Laboratory, Department of Physiology,
University College of Science & Technology, University of Calcutta,
92, APC Road, Kolkata – 700 009, India

Email:rapti1982@rediffmail.com

Abstract

Objectives: Study of occupational health problems of working women is lacking, particularly in third world country, where the concept of occupational health hazards is very much neglected. Housemaids of India belong to low socio-economic group, who perform strenuous jobs all over the year. The present study is being carried out to assess the prevalence of work-related musculoskeletal disorders and the associated mental stress among the part time housemaids of West Bengal.

Methods: Detailed questionnaire analysis followed by psychological and physiological study and subsequent analysis of work posture have been done.

Results: It has been revealed that most of them are victims of work stress. Moreover, they adopt awkward postures during work. The psychological study reveals that most of them suffer from severe work related stress. Principal household chores exert significant physiological load on them.

Discussion: Excessive work pressure, erratic work schedule, poor work environment, proneness of accidents, lack of co-operation from employer and most importantly the burden of supporting the family- all these factors lead to the development of psychological stress, which further deteriorate their health.

Conclusion: As a whole it can be concluded that occupational health of housemaids is very poor. Serious steps need to be taken for their improvement.

Keywords: housemaids, India, occupational stress, West Bengal, working women.

**BEST PRACTICES IN HUMAN RESOURCE MANAGEMENT:
ERGONOMICS AS AN EMPLOYEE RETENTION TOOL**

Abhijit Sen

College of Management, Institute of Engineering & Management,
Saltlake, Kolkata-700091
Email: abhijitsen10@gmail.com

Abstract

Organizations around the world are following the best practices in HR to obtain a strategic and competitive advantage by attracting and retaining the best talent. High rates of attrition not only increases costs but signifies poor working conditions and low brand equity.

Ergonomic interventions are increasingly being used to reduce labour turnover rates. The present study conducted in the IT sector of Kolkata assesses the best practices being used by HR managers and ergonomic interventions to decrease attrition rates. HR managers of 15 IT/ITeS companies participated in the study.

The study revealed that the biggest challenges lay in the areas of retaining employees, recruitment and expansion. Ergonomics can be used as a tool for retaining employees and increasing productivity.

It is therefore recommended that such tools be used to reduce turnover rates and increase employee engagement.

Keywords: Attrition, strategic advantage, HR best practices, ergonomic interventions, retention tool

VITAMIN E – A MODIFIER OF PLATELET FUNCTION AND ENDURANCE CAPACITY

Subhalakshmi Maitra¹, Satadal Das², And Arunabha Bandyopadhyay³

¹Department of Physiology, Bankura Christian College,
Bankura-722101, West Bengal, India.

²Consultant Pathologist, B.C. Roy Research Institute,
Peerless Hospital, Kolkata, West Bengal, India.

³Department of Physiology, Saldiha College, Saldiha,
Bankura-722173, West Bengal, India.

Email: arunabha_bandyopadhyay@rediffmail.com

Abstract

The present investigation was aimed to assess the effect of Vitamin E supplementation on platelet aggregation and endurance capacity of females, during different phases of their menstrual cycle.

For this study female subjects were selected on the basis of age and same socio-economic status. All the female subjects also possessed normal menstrual history. The physiological parameters like heart rate, systolic blood pressure, diastolic blood pressure, oral temperature, hemoglobin concentration were measured employing standard procedures.

Endurance capacity (min) of both sedentary and athletic females were determined both before and after supplementation of Vitamin E during the different phases of menstrual cycle. Platelet aggregation was also determined by using optical absorbance technique. Investigation revealed that Vitamin E significantly decreases exercise induced and ADP (at 5% level) induced rise of platelet aggregation during all the phases of menstrual cycle, both in case of sedentary and athletic females.

Keywords: Vitamin E, hemoglobin, endurance capacity, athlete

WORK POSTURE ASSESSMENT IN CASTING INDUSTRY: AN EXPLORATORY STUDY

L P Singh ^[1], Mandeep K ^[2], Bhardwaj A ^[3] and K.K. Deepak ^[4].

^{[1], [2] & [3]} Department of Industrial & Production Engineering,

Dr B R Ambedkar national Institute of Technology, Jalandhar, Punjab, (India)

^[4] Department of Physiology, All India Institute of Medical Science,

New Delhi, (India).

Email:mandeepmystic@yahoo.com

Abstract

Casting units involves various kinds of hazardous jobs which may cause musculoskeletal disorders among the working generation. Awkward posture, lifting, forceful movements and manual work at rapid rate contribute to musculoskeletal disorders. Due to lack of resources to deal with occupational safety and health issues in small and medium scale industries musculoskeletal disorders are the major cause of occupational illness and economical loss affects the organization.

An ergonomic evaluation of a Casting Industry was completed and a video film was taken during the evaluation. The evaluation had the objective of assessment of the level of exposure to musculoskeletal disorder. The evaluation constitutes analytical tools- RULA assessment, REBA assessment and OWAS assessment. RULA and REBA are designed to operators who may be exposed to musculoskeletal loading which are known to contribute to upper limb disorders and entire body disorders.

In RULA assessment workers at high and medium risk levels were 64% and 22% respectively. In REBA assessment workers at very high, high and medium risk levels were 27%, 34% and 32% respectively. Similarly, In OWAS assessment workers on which corrective measures to be taken immediately and as soon as possible were 17% and 46% respectively. This evaluation shows that musculoskeletal disorders have become a severe problem.

Awkward postures and manual material handing in the workplace should be eliminated & small and medium scale industries should adopt ergonomics techniques and automation techniques so that workload can be reduced and efficiency can be increased to effect the organizational cost and the society as a whole.

Keywords: musculoskeletal disorders, awkward postures, RULA, REBA, OWAS

ERGONOMIC CONSIDERATION OF EXERCISE

Ankur sharma

B.P.T, Fitness Trainer, Jaipur (Raj)

Email: sharma.ankur62@yahoo.com

We all engage our self in different types of exercises, whether it is anaerobic, aerobic, core stability exercise etc to reach the optimum level of Physical Fitness.

When exhausting the body in an exercise, Ergonomics plays an important role in following -
:

- Proper Assessment of body prior to Exercise.
- Posture of the body & Alignment of the body parts during an Exercise.
- Proper method of performing Exercise.
- Use of various types of Supportive Equipments.
- Principles of Physical Fitness.
- Problems due to lack of Exercise.
- Benefits of Exercise.
- Precautions during Exercises.

If we could just follow the Principles of Ergonomics while following the exercise regime, we can reduce the chances of Soft Tissue Injuries, Maximise the results of workout without hampering the Activities of Daily Living and lead a much healthier life style.

Keywords: Ergonomics, exercise, physical fitness, soft tissue injuries

EFFICACY COMPARISON OF STATIC AND DYNAMIC ANKLE- FOOT ORTHOSIS IN CHILDREN WITH CEREBRAL PALSY

S. Ali Hosseini¹ and M. Farahbod²

¹Occupational Therapy Department, University of Social Welfare & Rehabilitation Sciences, Tehran, Iran

²Research Institute of Education/ Research Institute of Exceptional children, Tehran, Iran

Email: sahosseini@uswr.ac.ir

Abstract

Introduction: Equinus is one of the most common deformities in children with cerebral palsy (CP). Equinus is usually dynamic at early stage but becomes fixed whenever the gastro-soleus muscles get contracture. Ankle-Foot Orthosis (AFO) is often advised to control the deformity. The orthosis affects the ankle plantar flexion and knee extension chain, improved push-off and provide the possibility to heel to be in contact with ground.

Methodology: The study was a Quasi Experimental and interventional type of research. Thirty children 4-6 years (mean 69.6 months) with spastic CP were included in this study. Subjects selected based on inclusion criteria. All children divided in three groups randomly. First group received current therapy without using AFO. Second group received current therapy along with static AFO and third group received current program along with dynamic AFO. Intervention for all groups performed for 4 months. AFO for two groups used for 6 hours per day, (four times with 1.5 hours). Current therapy using Bobath approach was performed by expert Occupational therapists. Wechsler preschool and primary scale of intelligence (WPPSI) was used to assess the IQ and GMFM-66 (Gross Motor Function Measure) has been used for evaluation of gross motor function especially in standing, walking and running.

Findings of this study showed that there was significant difference of mean between current therapy group and the group with dynamic AFO, also between the static group and dynamic group. There was no meaningful difference between current therapy group and static AFO group ($P = 0.19$).

Conclusion: in this study it is concluded that dynamic AFO is more efficient than static AFO to improve the gross motor activity especially for standing balance, walking and running.

Keywords: Children, Cerebral palsy, Ankle-Foot Orthosis, Static, Dynamic

EVALIATION OF GROWTH, NUTRITIONAL STATUS AND CARDIAC EFFICIENCY INDEX IN PRIMARY SCHOOL GOING CHILDREN FROM LOW INCOME FAMILIES IN KOLKATA

Aindrila Das¹, Alok Chattopadhyay² and Samir Kumar Ghosh³

²Hori Mohan Ghosh College, Kolkata

^{1&3}Vidyasagar (Evening) College, Kolkata

Email: gamirkumar_99@yahoo.co.in

Abstract

The age of 6-12 years is a period of growth and at this stage, the foundation for adulthood is laid down. Hence, nutritional deprivation during this period may influence the adult size and capabilities of the individual at latter stages of life. The fast growth and evolution of children permits the necessity for considering their status both qualitatively and quantitatively.

A total number of 400 children (135 girls and 265 boys) were selected for the present study. Data were collected by means of experimental observations and home dietary intake using 24 hour dietary recall method. Height for age (Stunting), Weight for age (Nutritional status) and the Weight for Height (Wasting) z-scores were calculated. A validation study has provided support for the use of these nutritional indices in children. Age and sex specific BMI centile values (NHANES) were used to categorize children into various nutritional grades.

The results of the present study indicate that a significant number of children in the cross section show nutritional deficiency. It is not unlikely that still a greater percentage of the children in the present study group may come up with symptoms of various types of nutritional deficiency in days to come; because it takes time for nutritional deficiency to manifest. Another important observation is the poor physical fitness of the participants in the present study particularly among the boys even though they get relatively better care than their female counterparts. We recommend further extensive studies to be carried out with this section of children to create awareness not only to the families under study but at the same time to bring it to notice of the State Govt., Central Govt., and N. G. Os. So that attempts are made to ameliorate the situation.

Keywords: evaluation of growth, nutritional status, cardiac efficiency index, school going children

**A STUDY ON WORK RELATED MUSCULOSKELETAL DISORDER OF
THE FEMALE FISH PROCESSING WORKERS IN WEST BENGAL**

Sangita Barman, Suhana Ghosh and Ananga Mohan Chandra

Department of Physiology, University College of Science and Technology

University of Calcutta, India

Email: aamisangi@gmail.com, _sangitabarman@yahoo.com

Abstract

The present investigation has been carried out on women prawn processing workers for the evaluation of musculoskeletal disorder, if any, while engaged in peeling work of prawn processing unit.

50 female workers from the Benfish, a food processing unit of Govt. of West Bengal, Kolkata were selected. Their musculo-skeletal problems were evaluated by questionnaire method and by the analysis of working postures. Different environmental parameters such as illumination and sound level of the work station were also measured.

The analyzed data showed that the Peeling workers often work in awkward posture and suffer from musculo-skeletal problem, mainly affecting the neck (56%), shoulder (50%), wrist (60%), lower portion back (54%) etc. The assessment of environmental parameters also showed that the illumination level and sound level are not suitable for work.

The results suggested that hazardous postures should be rectified as soon as possible by necessary modification the existing work station. The environment of the workstation should also be changed according to the work-need. Application of ergonomic solutions to these existing problems will ultimately help the workers to maintain good health and increase their productivity in future.

Keywords: Prawn processing units, peeling workers, awkward posture, musculoskeletal disorder

EVALUATION OF MISMATCH BETWEEN BODY DIMENSION OF PRE AND POST PUBERTAL FEMALE STUDENTS AND CLASSROOM FURNITURE

Zeba Zarrin¹, Raghwendra Mishra², Pratush Bhar¹, Debasish Sen¹, Alak Kumar Syamal¹

¹ Division of Ergonomics and Work Physiology, Department of Physiology,
Presidency College, Kolkata.

²Department of Neonatology, Institute of
Post Graduate Medical Education & Research & SSKM Hospital, Kolkata.

Email : alak_syamalpresi@yahoo.co.in; r_mishra82@yahoo.co.in

Abstract

Children spend a large part of their time in schools. The design of workplace for students should ensure effective learning process and comfort. There is a prominent sex differences in anthropometry-the post pubertal growth in female is different from that of male.

The purpose of this study was to examine possible mismatch between the body dimensions of the pre and post pubertal female students and the classroom furniture they use.

A total of 50 pre-pubertal (9-13 yrs) and 50 post-pubertal (13-16 yrs) from different secondary schools in Kolkata, West Bengal have participated in the study. Anthropometric dimensions of different body parts of students and frequently used furniture prevalent in the classroom were measured. Postural analysis while performing different tasks was done by using Rapid Upper Limb Assessment (RULA) method. Various measurements of students and furniture dimensions were compared by using the criteria of mismatch as in Parcels et al study (1999) to identify any incompatibility between them.

The results indicate a substantial degree of mismatch between the body dimension of students and class room furniture available to them. The ill-fitting furniture was found to impose a high level of postural strain and musculoskeletal pain in different body parts.

Maximum student endure sitting arrangements in their classroom that are not favorable to learning. It is unlikely that any furniture with fixed dimensions is going to accommodate a majority of students. The health hazard and postural strain may occur due to use of ill-fitting furniture.

Key words: Puberty, Anthropometry, Mismatch, Furniture, Musculo-skeletal Disorder.

ERGONOMIC EVALUATION OF CLASSROOMS OF DIFFERENT SCHOOLS OF KOLKATA

Raghwendra Mishra¹, Md Ali Zinna², Debasish Sen², Alak Kumar Syamal²

¹Department of Neonatology, Institute of

Post Graduate Medical Education & Research & SSKM Hospital, Kolkata.

²Division of Ergonomics and Work Physiology, Department of Physiology,
Presidency College, Kolkata.

Email: alak_syamalpresi@yahoo.co.in; r_mishra82@yahoo.co.in

Abstract:

The classroom is the basic structural unit of our educational system. There is strong, consistent evidence for the effect of basic physical variables (temperature, noise, illumination, furniture fitness and their layout, etc) on learning. This study aims to evaluate the physical variables of Classrooms.

The study was conducted in the classes of secondary section of schools in Kolkata, West Bengal. Noise, illumination, thermal stress (in term of WBGT index) levels were measured at different time interval during summer season in the selected schools. 50 students (11-16 years) from each schools, 10 from each class VI to X, were randomly selected to check the fitness of the prevalent furnitures to them. Required anthropometric measurements of the students and furnitures were taken for this purpose. Postural analysis of the students while performing different tasks was done by using Rapid Upper Limb Assessment (RULA) method.

Noise, illumination and thermal stress level are compared according to standard literature, whereas criteria of fitness of furniture were considered as in Parcels et al study (1999).

The results were expressed as mean±standard deviation and percentage as required. Noise (73.08±3.75 dBA) and thermal stress levels (28.57±0.64°C) were found to be within the threshold limit value. The illumination levels (109.69±42.89 at desks and 80±26.12 at board) were found to be less than the recommended levels in the classrooms. The anthropometric measurements indicate a substantial degree of mismatch between the body dimension of students and class room furniture available to them. The ill-fitting furniture was found to impose a high level of postural strain and musculoskeletal pain in different body parts.

The study indicates that a proper concern about the illumination level and fitness of furniture in the classrooms should ensure effective learning process and comfort.

Key Words: Classroom, Physical Variables, Students, Discomfort.

STANDARDIZATION OF PICTORIAL VAS FOR MEASURING INTENSITY OF LOW BACK PAIN IN STANDING POSTURES OF RURAL WOMEN

Sujata Kumari* and Vandana Kaushik**

*Maharana Pratap University of Agriculture & Technology, Udaipur, Rajasthan-313001

** 60, Vidya Nagar, Hiran Magari Sector – 4, Udaipur. 313002

Email: sujata_choudhary27@yahoo.co.in

Abstract

The low back, or lumber area, serves a number of important functions for the women in working area. Low back pain is a widespread and costly problem in rural women. It is a common condition that affects an estimated 70 percent to 80 percent of rural women at some points during their life times. The present paper will show standardization of Pictorial Visual Analog Scale for measuring intensity of low back pain in standing postures has reported by rural women. The scale is focused on the standing postures, adopted by rural women; it is meant for analysing postures in relation to their effect on low back region. The scale was developed on the responses of 100 rural women of Udaipur district of Rajasthan. The pictures were screened through item- total correlation and item difference analysis. The final list had 26 items, each to be responded by women respondents in terms of their own degree of intensity of low back pain on ten point scale.

It was tested for its reliability and validity by spilt half method and by calculating Karl Pearson's coefficient correlation. The reliability score of the scale by spilt half method came to be 0.884 and validity score was 0.919, thus the scale is highly reliable and valid for the purpose it was developed.

Keywords: visual analog scale, low back pain, postures, rural women