Ergonomics study of the workplace of a catering service assistant.

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ABSTRACT

The present study is developed in the kitchen installations at the Hospital of Barcelona, which are managed by Hostelería BCN company. At the last years BCN has detected an increase in the number of work accidents as the number of losses by disease, specifically in the job of Helping of Cars.
The objective of this study is to identify those critic tasks of the job and to find a correlation between inadequate work conditions and the increase of work accidents and diseases, by analysing job ergonomic aspects in accordance with the methods to value the in the INST. and by means tables of values limits for tasks that involve to push or to pull load, developed by Snook and Ciriello.

Keywords.
Ergonomics, Manual Handling Tasks, lifting, pushing and pulling, risk.

1.- INTRODUCTION

This study has been done in a real company that we will call BCN.
Hosteleria BCN-Spain belongs to BCN Corporation with headquarters in Philadelphia (the U.S.A.). BCN is a management of services company, which it emphasizes specially the restoration for groups. At the present time, BCN-Spain manages the restoration service of more than 300 centers of work and more than 80 kitchens and cafeterias services in hospitals centers in all the Spanish territory.

The present study has been made at the Hospital Nº 1 of Badalona kitchen service, managed for more than 16 years by East BCN. There are 73 workers, who are distributed, in different tasks (cooks, kitchen assistants, aids on service and cleaning, administrative, dietistas, helpers of cars, marmitones, waiters and cashiers). In order to take a greater activity center control, there is a center director, as in the rest-managed centers; he is the person who directs the activity at the centre. The absenteeism index, including the losses by industrial accidents and the losses by common diseases, at this center is very elevated in relation to others company centers. BCN worried about these high indices reached at this Hospital, makes an analysis of the absenteeism with the purpose of locating the task that registers a greater absenteeism index, identifying the task of helping of cars (also denominated aid on watch and cleaning) like the job with more absenteeism. As far as the predominant pathologies like losses by common disease, they are the musculoskeletal pathology and the psychiatric pathology, with 37.5 %

and 20.8 % of the total losses respectively. These data have been facilitated by the company medical service.

BCN Management of Human Resources worried about the tendency of the absenteeism at company level, decided to make a work climate study denominated "opinion poll of Satisfaction".

As the result of study, we must stand out that the most negative scores according to the different items of the study were obtained by the east centers. In this region, the center that worse valued all the items was the Hospital Nº 1 of Badalona.

Between the worse valued items were the following:

-Working environment conditions
-Lack of promotion and development
-Excessive load work
- Lack of valuation of made tasks
- Identification with the company
- Wage
- Security and conditions of work

Such valuations cannot pass inadvertent, since all the items were valued below the results obtained in the rest of region centers.

BCN- Spain worried about the high absenteeism index that presents/displays its work center of the Hospital Nº 1, reflected in the number of losses by common disease and losses by registered industrial accidents in the three last years, in the job of helping of cars, asked for an analysis and valuation of risks. The objective was to identify those tasks or critic situations that cause inadequate work conditions (1) and looking for a direct correlation between these conditions and the high absenteeism index that takes place in the job of helping of cars of this Hospital.

2. -MATERIAL AND METHODS.

2.1.Interviews

2.1.1. - The present study began making verbal interviews to helping of cars workers, this aimed to emphasize the negative aspects that they founded in their jobs. The signs of these workers were directed to criticize two concrete aspects of the work conditions: the work environmental conditions and the cars used to the transport of food to the floors, doing special emphasis in the weight of such and the handling of the trays. This was correlated with the high job accidentability and with the absenteeism index so elevated that it undergoes the center.

2.1.2. - In this work center there is a Security Committee and Health. Two prevention delegates and members of the Company Committee were interviewed, in order that they participate in the visit that would be made to the center and contribute problematic. Their commentaries went directed to the same way than the workers made, but extended their complaints to the behaviour to people in charge of section and the unconcern of the director of center in relation with the work conditions.

2.2. - Valuation criteria

Like Criterion of valuation is used the European Regulation (2) and the Real Decree 487/1997 (3) , of 14 of April, on minimum dispositions of security and health relative to the that involves risks, in back pain injuries particularly (), to the workers for whom we have emphasise the definition:

Any operation of transport or subjection load made for one or several workers will be understood like hand handle load, like lifting, placing, pushing, pulling or the displacement, that due to its characteristics or inadequate ergonomic conditions involve risks, back pain injuries particularly, to the workers.

2.3. – Workplace Description

The aid of cars is fitted within the professional category of helping on watch and cleaning.

The functions within the hospital are the following:

-Serving food in trays for its later placing in the car.
-Transporting cars from the kitchen to the corresponding floors of the hospital.
-Delivery of the trays to the aids of clinic at each floor of the Hospital
-Collection of the cars in the floor for its later transfer to kitchen.
-Cleared of the trays and cleaning of the cars.

The work schedules are distributed as follows:

Schedule morning	Schedule afternoon-night
07:00 15:00 hours	14:00 22:00 hours
08:00 16:00 hours	15:00 23:00 hours

2.4. - Methods.

To value the risk of the following methods were used:

A.-To - Technique guide of the INSHT

The National Institute of Security and Hygiene in the work has elaborated a Technical Guide for the Evaluation and Prevention of the Relative Risks hand handle Loads (4). This Guide exposes a method designed to evaluate the risks derived from the rise tasks and deposit of loads in foot position.

As general criterion the method considers loads, those whose weight exceeds 3 kg. In order to calculate the acceptable weight that can be handled in the existing conditions of work, the method considers the following factors:

- · Position of the load with respect to the body
- · Vertical displacement of the load
- · Turn of trunk
- · Type of takes hold
- · Handling frequency

Next also it is considered:

- Total weight transported daily
- Transport distance

This method will be applied to value the handling of the food trays, in which we differentiated two cases from study:

I. - Distribution of the trays by the rooms.
II. - Placing and removing of the trays from the tape to the car, and from the car to the cleared zone.

B. - Values Limit To push or To pull of Loads

The application of the tables developed by Snook and Ciriello (5,6.7,8) allows to determine the values limit of initial force and maintained force necessary to push or to pull loads, considering the following parameters:

- sex of the worker
- ·height which it is pushed or is pulled of the load (according to three levels: 64, 95 and 144 for men and 57, 89 and 135 for women)
- · displacement distance
- · push frequency

The result that is obtained corresponds to the percentile of population that can make the task analyzed with limited risk. This criterion also is applicable to value the required effort to push and to pull the food cars during its displacement. This method was applied in the valuation of pushes of two cases of study.
I - Cars of breakfast.
II- Cars of lunch and dinner.

3.- RESULTS.

3,1. - Ergonomic valuation of the load and unloads of the trays: Technique guide of the INSHT. The results of the valuation of the risk of hard works in the operation of the load and unloading of transported trays, It was made in both tasks indicated previously. Their summary results in tables 1 and 2.

Table 1

DISTRIBUTION OF THE TRAYS IN THE ROOMS	
Peso real de la carga	4,5 kg
Peso teórico recomendado en función de la zona de manipulación	19 kg (altura del hombro)
Desplazamiento vertical	0,87 (hasta 100 cm)
Giro del tronco	0,9 (girado hasta 30º)
Tipo de agarre	0,95 (agarre regular)

Frecuencia de manipulación	0,45 (4 veces/minuto)
Peso total transportado diariamente	4,158 kg
Distancia del transporte	4m
Peso teórico recomendado	19 kg.
Peso aceptable	**6,4 kg**

Table 2

PLACEMENT AND RETREAT OF TRAYS FROM THE TAPE TO THE CAR AND FROM THE CAR TO THE USE AREA	
Peso real de la carga	4,5 kg
Peso teórico recomendado en función de la zona de manipulación	19 kg (altura del hombro)
Desplazamiento vertical	0,87 (hasta 100 cm)
Giro del tronco	0,8 (girado hasta 60º)
Tipo de agarre	0,95 (agarre regular)
Frecuencia de manipulación	0,45 (4 veces/minuto)
Peso total transportado diariamente	4,536 kg
Distancia del transporte	1m
Peso teórico recomendado	19 kg.
Peso aceptable	**5,6 kg**

3.2.- Ergonomic valuation of the push of cars: Method of Snook and Cirello. The results of the valuation of the risk of push load pulling were made in both tasks indicated previously. Cards of data collection are made in each on of them (table 3), so it could be possible identify job evaluated as well as its results and recommendations.

Table 3

<table>
<tr><th>Cars of breakfast</th><th>Ciriello and Snook assessment</th></tr>
<tr><td>Carga del carro: 28 bandejas y 2 termos</td><td rowspan="9"> 
 
<u>RESULTADOS:</u>
❖ Riesgo LIMITADO para el 90 % de la población masculina.
❖ Riesgo LIMITADO para el 75 % de la población femenina.</td></tr>
<tr><td>Altura de la barra de empuje: 90 cm del suelo</td></tr>
<tr><td>Fuerza de empuje o tracción para poner en movimiento el carro: 15,8 kg</td></tr>
<tr><td>Fuerza de empuje o tracción para mantener en movimiento el carro: 7 kg</td></tr>
<tr><td>Altura de empuje:
95 cm para hombres
89 cm para mujeres</td></tr>
<tr><td>Frecuencia de empuje: 35 “</td></tr>
<tr><td>Distancia transportada: 15,2 metros</td></tr>
<tr><td><u>Valores límite para hombres:</u>
• Inicial 21 kg (percentil 90)
• Sostenida 10 kg (percentil 90)

<u>Valores límite para mujeres:</u>
• Inicial 13 kg (perc. 90)
16 kg (perc. 75)
• Sostenida: 6 kg (perc. 90)
8 kg (perc. 75)</td><td><u>CONCLUSIÓN:</u>
Riesgo derivado de empujar los carros: TOLERABLE

<u>RECOMENDACIONES:</u></td></tr>
</table>

The results obtained from valuation of the force used in the push, summary in table 4. These results correspond to the average of measures made in each case.

Table 4.

	Cars of breakfast	Cars of lunch and dinner	Límit Value
Pushing forse to put (Staring force)	15,8 kg (15,78 ±1,71)	11 kg (10,94 ±1,78)	25 Kg
Pushing forse to keep (Kept force)	7 kg	5 kg	10 Kg

4. - CONCLUSIONS.

4.1. - **Conclusions by methods.**

4.1.1. Technique guide of the INSHT.

- To Rooms distribution of the trays: In agreement with the method established at the Guide of the INSHT and with the carried out calculations. For 85 % of the population the risk that supposes the analyzed work considers ***TOLERABLE***.

- Placing and removing trays from the tape to the car and vice versa.:In agreement with the method established at the guide of the INSHT and with the conducted calculations: For 85 % of the population the risk that supposes the analyzed work considers ***TOLERABLE.***

4,1, Method of Snook and Cirello.

Comparing the values limits established in the method with the obtained ones in the measurements we can conclude that:

- The 90 % of the masculine population can handle so much the cars of the breakfast like those of lunch with ***LIMITED risk.***
- The 90 % of the feminine population can handle the cars of lunch with ***LIMITED risk***.
- The 75 % of the feminine population can handle the cars of the breakfast with ***LIMITED risk***.
- Therefore, in agreement with this criterion, we can conclude that the derived risk to push the cars is ***TOLERABLE.***

4,2. - GENERAL CONCLUSIONS.

- In all the valued jobs, the risk that means to handled loads understood under definition of RD 487, the workers are exposed to a TOLERABLE risk.

- The risk is tolerable in a very high percentage as much for the workers of both sexes.

- To the light of the results we can conclude that a direct relation between the risk of handling loads in this group and the losses associated to musculoskeletical injuries does not exist.

- It is probable that the losses by musculoskeletical injuries that exist in this group are associated to other not contemplated factors of risk in this study.

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