

Designing reasonable accommodation of the workplace: a new methodology based on risk assessment

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Abstract If working tasks are carried out in inadequate conditions, workers with functional limitations may, over time, risk developing further disabilities. While several validated risk assessment methods exist for able-bodied workers, few studies have been carried out for workers with disabilities. This paper, which reports the findings of a Study funded by the Italian Ministry of Labor, describes a general methodology for the technical and organizational re-design of a worksite, based on risk assessment and irrespective of any worker disability. To this end, a sample of 16 workers, composed of people with mild and severe motor disabilities, was recruited. By using a mix of risk assessment methods and the ICF taxonomy, the worksite was re-designed for each individual worker in the study, and a prospective evaluation was carried out to check whether the new design would eliminate the risks.

Keywords: risk assessment, worksite adaptation, reasonable accommodation

Background

The prospects for inclusion of persons with disabilities in mainstream employment have greatly expanded in recent years. There is today in Italy a series of regulations (chiefly Law 68, 13/3/1999) aimed at facilitating focused employment for persons with disabilities, and providing specific interventions to bridge possible disadvantages they might experience in comparison to able-bodied workers.

However, just ensuring an accessible workplace and adapting the worksite to allow the worker to carry out independently his or her working tasks, may not be sufficient. A full “reasonable accommodation” of the workplace is often needed.

This concept was first introduced in the early 1990s by the US Federal Law ADA (American Disability Act) within the framework of measures preventing discrimination against people with disabilities, and now is recognized as a fundamental right by the UN Convention on the Rights of People with disabilities (art. 27). The term “reasonable” stands

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for “not putting an undue burden on the employer” while the term “accommodation” refers to arrangements such as 1) overall accessibility of the working environment 2) technical redesign of the worksite 3) assistive devices to help perform working tasks 4) re-organization of work processes or workflow and 5) personal assistance when needed [1].

In particular, providing a reasonable accommodation should also mean checking whether the worker will be able to maintain the ability to carry out the job in the long run. Some working tasks may expose the worker to efforts that gradually damage his or her physical condition further, leading to increased disability both in the workplace and in daily life. The worker may become no longer able to carry out that job and thus be forced to another job or even to leave employment.

Preventing the onset of a disability due to working tasks is a well studied issue within the much larger population of able-bodied workers. Society bears an enormous social cost for work leaves, anticipated retirements, or forcing people to move to other jobs that do not exploit fully the worker’s education and skills, due to unsuitable working conditions. That’s why in most Countries regulations have been enacted for safety in the work environment, and risk assessment procedures have been set-up to early detect possible risky situations in order to implement preventive measures (re-organisation of the workflow; technical adaptation of the worksite; lay-out re-arrangements etc.). Instruments have been developed and validated for preventive risk assessment, such as the OCRA (Occupational Risk Assessment) [2] for tasks performed by means of upper limbs, the NIOSH [3] for lifting tasks, the MAPO [4] for persons handling tasks and the Snook & Ciriello tables [5] for carrying or pulling/pushing tasks. A commonality shared by these methods is the ability to detect risk factors and infer the overall risk level (from “no risk” to “very high risk”) which the worker is exposed to. Although they revealed very successful with the “able-bodied” workers – thus they are widely used in Occupational Medicine today – they often fail when applied to workers with disabilities, for the simple reason that their body structure or the extent of their body functions is different from the “able-bodied” standard.

The ICF taxonomy [6] provides an effective way to describe such difference, in terms of “body functions” (e.g.: b730 “muscle power functions”) with the associated qualifier (ranging from 0 to 4, i.e. from “no limitation” to “complete limitation”). In order to address the issue of risk assessment for workers with disabilities – a topic that has been scarcely investigated so far – the Italian Ministry of Labour funded a Study that was carried out by Fondazione Don Gnocchi Onlus in Milano.

Method

First, the Study made an inventory of validated instruments for risk assessment at the workplace, and investigated their applicability to workers that do not meet the “able bodied” standard (no limitation in any function).

Second, it sought suitable taxonomies to measure the disability of a worker. Indeed, the traditional constructs of “invalidity” (health condition certified by Law to enable access to benefits such as pensions – traditionally corresponding to the percentage of inability to work) was not usable in this Study, whose focus is on methods to help keep people in the

productive workforce irrespectively of their functional limitations. Again, ICF provided suitable descriptors in terms of *activities/participation* – with associated qualifier of performance, ranging from 0 to 4, i.e. from full performance to full restriction – and *environmental factors* – qualified as barriers (0 to 4 i.e. no barrier to complete barrier) or facilitators (0 to +4 i.e. no facilitator to complete facilitator).

Third, an heterogeneous sample of 15 disabled workers was recruited to try out all the methods in the inventory, and to find to what extent each method actually detects risk.

The selection criteria included the type of job, the working tasks involved and whether the disability was a consequence of the working tasks carried out for years or rather due to illnesses or other non-work-related factors (Table 1).

Type of job	Case Study	Origin of disability	Percentage of invalidity
Metal workers	Domenico	Non-work related	75%
	Gigliola	Work related	/
Textile workers	Carla	Work related	/
	Sonia	Work related	/
Storekeepers	Giorgio	Non-work related	70%
ICT workers	Antonietta	Non-work related	74%
	Clara	Non-work related	100%
	Francesco	Non-work related	100%
	Mauro	Non-work related	67%
	Stefano	Non-work related	100%
	Clara	Non-work related	100%
Artisans	Carlo	Non-work related	/
Health workers	Vito	Work related	/
Driver	Domingo	Work related	/
Domestic workers	Bruno	Non-work related	100%
	Nadia	Non-work related	100%

Table 1. Overview of the workers involved in the study

Results

For each worker, the worksite was technically re-designed based on the findings of a risk assessment process (Figure 1). Finally, prospective outcome assessment was carried out to check whether the new design would eliminate the risks. For each worker, the worksite redesign proceeded iteratively (hypothesis / verification) and gradually led to a methodology that has been proven effective and repeatable, at least in the cases under examination.

The use of risk assessment methods related to biomechanical overload, although developed and validated in relation to “able-bodied” standards, proved useful as a first approach, because it provides inspiration for analysis of the functional demands of the tasks and suggested procedures for investigating any possible risk. The use proved to be a good starting point, due to their ability to guide the job re-design process by simulating the change of the risk analysis factors that any method of risk assessment considers (Table 2). However, they could not by themselves lead to the solution of each individual case,

because of the variability of disabilities and working tasks. Indeed, although some common points exist for analysis both for healthy people than for those with disabilities or disease, some issues still need an individualized analysis.



Fig 1. An example of reasonable accommodation, from the case study Francesco (computer programmer and help desk operator in an ICT Company). The re-designed worksite (center and right) increased comfort, allowed for more independence across the whole working day, and significantly reduced the risk of future onset of pain and damage to the neck muscles that was detected in the original worksite (left).

Risk factors: prospective outcome assessment ○ = Lower risk ● = Same risk	Antonietta	Bruno	Carlo	Clara	Domenico	Francesco	Mauro	Nadia	Stefano	Carla	Domingo	Gigliola	Giorgio	Sonia
Shift duration	●	●	○	○	○	○	●	●	○	●	●	●	●	●
Recovery	●	●	○	○	○	○	○	●	○	○	○	○	○	○
Posture	○	●	○	○	○	○	○	●	○	○	○	○	○	○
Force	○	●	○	○	○	○	●	●	○	○	○	○	○	○
Action frequency	○	●	●	○	●	○	○	●	●	●	○	○	○	○
Environment	●	○	○	○	○	○	○	○	○	○	●	○	○	○

Table 2. Prospective results of the redesign obtained simulating the change of the risk analysis factors

In brief, the developed methodology consists of a personalized assessment – based on a multidimensional analysis of the working tasks and the work environment – that describes comprehensively the disability in the current working setup, and estimates the risk of disability worsening in case no accommodation is undertaken. What's more, it assists in developing an optimized re-design of the workplace, so as to enable the worker to continue the same activities at an appropriate level of productivity and comfort, but without any risk.

The assessment protocol includes a number of meetings, inspections, measurements and interviews (Table 3), involving a multidisciplinary team requiring the active participation and consensus-building among all stakeholders, especially the worker her/himself.

The implementation of a reasonable accommodation should be accompanied by appropriate training, so as to motivate the various stakeholders involved, to positively accept and understand the process of change.

Once the reasonable accommodation has been implemented, monitoring is needed through periodical follow-ups to check whether the objectives have been effectively

achieved. The validated instruments that performed best in this study were the IPPA (Individual Problem prioritized Assessment) [7] and the QUEST (Quebec User Evaluation of Satisfaction with Technical Aids) [8].

This study also opened a window for future developments of a more systematic approach for analyzing the functional demands in the workplace and leading to the requirements for reasonable accommodation.

Methodology for design of a reasonable accommodation based on risk assessment	
Phase	Deliverable
1	Job functional demands analysis
2	On site inspection in the workplace
3	Functional analysis - performance assessment
4	Functional analysis - medical validation
5	Assessment of possible needs for assistive technology devices
6	Reasonable accommodation – proof of concept
7	Medical validation of the proof of concept
8	Technical validation of the proof of concept
9	Work re design – executive project
10	Submission of the final deliverable and training of the company representative

Table 3: The ten phases of the proposed methodology

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