Physical and mental load during supermarket cashier work

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1. Background
To keep the older employees longer at work, physical complaints and their relation with the job tasks were questioned in a pilot study. Pain in the low back, shoulders and knees were common in the polyvalent supermarket operators with more than 15 years of experience. Although these workers have to do several tasks in the supermarket, the physical complaints were primarily linked at cashier work. At the checkout the employees have to scan and to transfer the products. The goal of this study was to reveal why the operators perceive doing cashier work as heavy.

2. Methodology
The physical and mental load were investigated subjectively and objectively in 15 supermarket operators. Stari is a participatory method that asks which tasks they have to do, which ergonomics risk factors are present, their physical complaints and possible solutions. Muscle activity was objectively measured at the low back (m. Erector Spinae), forearms (m. Extensor carpi radialis brevis) and shoulders (m. Trapezius pars descendens). The operators performed a typical cashier task during 15 minutes in controlled conditions. The content of the shopping cart was always the same to compare three situations: applying an ergonomic working method, neglecting this working method and working with low carts at knee level. The EMG activity was also registered during a long period (2x3h) in real working conditions to investigate muscle fatigue.

The mental workload was questioned in three discussion groups about how the operators experience or perceive working in a supermarket and more specifically at the checkout. The stress level was also objectively measured and calculated by an algorithm based on heart rate and movement (accelerometer) during real cashier work. The peak signals were afterwards discussed and explained by the employee while looking at the video images of these stress situations.

3. Results
The Stari method revealed that bending the back was associated with working at the low carts. These are mostly used for heavy weights like trays of soft drinks or cases of beer. The combination of the awkward posture and the weight is a burden for the back. Another risk factor was the work duration. Doing prolonged cashier work -more than two hours continuously- was considered as a pronounced mental load. The supermarket operators mentioned that their concentration diminishes, they make more mistakes and they communicate less with the clients. Mentally they switch to an autopilot mode.

The muscle activity at the low back confirmed a higher physical load when replacing products at the low carts compared to the normal higher shopping carts (39%). During the standard cashier work, attention for a good working posture reduces the load on the spine. Applying the ergonomics-based working method or not revealed a difference of 12% in the muscle activity at the low back. However, there were no signs of muscle fatigue after six hours of cashier work. The physical load of the back, shoulders and forearms was acceptable.

During the group discussions the polyvalent operators made clear that cashier work is perceived as less popular. The physical load however was not the explanation. Although they like working in a supermarket and like the checkout system, the employees preferred cashier work the least. Reason is that the checkout tasks are considered as low level in the hierarchy and they experience less job satisfaction. They don’t see the result of their work and it’s difficult to read the customer satisfaction. It is mentally more loading compared to putting out the products in the racks. The work duration of prolonged cashier work was again a critical factor.
The objective stress measurements confirmed that interpersonal relations caused stress peaks and not the job tasks. Contact with clients and colleagues resulted in both positive and negative reactions. Everything that disturbs the optimal contact with the client or makes the client waiting, for example a missing barcode, is a possible source of stress. The mental fatigue however after two hours of cashier work could not be confirmed in these objective stress signals.

4. Discussion
The combination of questioning and measuring the physical and mental load resulted in an interesting insight in the perception of working at the checkout. The psychosocial factors explained more the subjectively experienced fatigue during the cashier work. To improve the negative perception of the checkout several solutions were proposed: upgrading the value of cashier work, training about how to deal with clients, balancing working schedules, etc...

The physical load was acceptable when scanning and transferring products in normal shopping carts. Applying the ergonomically sound working method means the lowest load on the back. It's worth to continue the effort to make a habit of this instruction. However, the low carts showed subjectively and objectively a considerable load for the low back. Reducing the working time or raising the height of these carts were suggested improvements.