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Should construction workers work harder to improve their health?

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Should construction workers work harder to improve their health?

Fifty years ago, the overall picture of health and safety in the construction industry was quite different. Lead poisoning, other toxic exposures, and fatal accidents dominated the occupational health debate (1) while musculoskeletal disorders and occupational disability were not seriously discussed. Nowadays, as in most branches of industry, the mean age of construction workers is increasing due to the decreasing influx of young people into the sector (3). The expectation is that it will be difficult to maintain productivity with the current fitness and work ability levels of older workers. The problem at hand is, therefore, rather new.

In this issue of the *Scandinavian Journal of Work, Environment & Health*, Oude Hengel et al (2) report the results of a randomized controlled trial (RCT) in the construction industry that aimed to improve work ability and health and reduce sick leave. The authors have to be complimented for undertaking a RCT of a complex intervention in a difficult setting where many would argue the infeasiblity of such a task. At the same time the results are sobering. As the authors understate, "further implementation of this intervention is not recommended at this time".

Why is randomization important? Randomization prevents selection bias and baseline differences of confounders or prognostic factors. Especially when effect sizes are small, randomization increases the validity of the study (3). However, randomization is also difficult because the researcher has to explain to the eligible participants that they may or may not receive the intervention. In addition, it is difficult to maintain a very long follow-up of participants without co-interventions. Otherwise, there are no differences between a controlled and a RCT study.

In what situation is randomization infeasible? It is impossible to randomize individuals when the intervention is implemented at the group level, such as is the case with many workplace interventions. In an RCT, inviting participants is probably also more difficult in an environment outside the healthcare sector. The fewer units that are available for randomization, the more unlikely it is that the intervention and control groups will be similar.

Cluster- or group randomization is an elegant way to overcome the problems mentioned here. Instead of randomizing individual participants, whole groups of patients are randomized, for example, departments of a firm or a healthcare practitioner's patients. An additional benefit of cluster randomization is that it prevents uptake of the intervention by the control group, which might be "contaminated" by the intervention participants. However, in case of workplace interventions, this contamination is exactly the argument in favor of why workplace interventions are preferred above general population interventions. In theory, the communal spirit at work should increase the effect of health promotion. However, there is no hard evidence of such an effect, and this is also illustrated by the low intra-cluster coefficients in the Oude Hengel et al study (2). Moreover, experts usually prefer the risk of contamination over the drawbacks of cluster randomization. One such drawback is that group randomization does not concur with the demands of statistical theory that individual participants should be independent. When analyzed at the individual level, this lack of independence artificially narrows the confidence interval of the effect size. This increases the likelihood of incorrectly concluding a significant beneficial result. To avoid this, the sample size should be increased and the analysis should take the clustering effect into account. This is possible with simple techniques but nowadays most researchers would prefer multilevel regression analyses, which are more difficult to interpret (4).

Improving work ability in a preventive, proactive way is not easy. Current interventions are supposed

to influence work ability in the long run, say after ten years. At short-term follow-up, we can then only measure surrogate indicators of long-term work disability. It is unclear if health and health behavior are such indicators. Therefore, RCT might not be the most helpful research designs in this case; it might be better to revert to non-randomized study designs such as cohort studies (5).

Other problems with work ability are that the concept is ill-defined, the validity of the measurement is not well known, and the theory on how to improve work ability is not well underpinned with empirical studies (6). For improving or preserving future work ability, researchers seem – to a large extent – to rely on increasing physical fitness by means of exercise training (7) or improving cardiovascular risk factors (8). This led to varying results in the studies. In my opinion, work ability is a complex concept based on a person's self-judgment of physical capacity and beliefs about functioning in relation to disease and old age. It is unclear how this would be influenced by exercise or cardiovascular risk factors. It is interesting to see that the approach of the Oude Hengel et al's study is more creative than most other studies: in addition to training sessions by a physiotherapist, there were empowerment sessions and a rest break tool.

The physiotherapist's task was to reduce the physical workload of workers. It is not easy to see how this would lead to improved work ability in the long run. It is well known that instruction and training do not decrease back pain most probably because it is not possible to decrease the load enough (9). There is no evidence that this is better with other musculoskeletal complaints. Moreover, there is a trade-off between lowering workload and productivity especially in the construction industry. It is easy to lower the workload but this comes at the expense of productivity (10). Therefore, it could well be that the labor market will solve the problem of aging workers and lower productivity rather than occupational health interventions.

In addition, there is the contrariety of decreasing physical activity at work and increasing physical activity in leisure time. Our level of physical activity has been decreasing over the past 30 odd years, which is of course a public health concern. Much of the decrease is due to decreasing activity at work (11), but it is contradictory to decrease physical activity at work while simultaneously promoting it outside work. However, this seems to be what we are doing in the construction industry. In addition, it is unclear which combination of workload and leisure-time activity puts workers most at risk of cardiovascular disease. (12). Therefore, the challenge is not to decrease the physical load at work but rather to transform it into a workload that keeps workers healthy.

If simple interventions do not work, researchers often recommend multi-modal or multi-component interventions. However, even though this sounds alluring, if this is not underpinned with an idea of how these components will influence an underlying mechanism of disease or occupational disability, it seems a shotgun approach. As in the Oude Hengel et al study, even in spite of a careful process evaluation, in the end it is very difficult to judge which of the interventions did not work and why. Focusing on the rest-break tool might have been more informative. It would have been a wonderful result if the study could have shown the effect of the tool on fatigue among workers using the tool at the end of the day. In general, for evaluation of complex interventions, it is recommended to build up the evaluation in a phased approach starting with feasibility studies and ending with an RCT (13).

It is good to see studies with negative results published because it is well known that getting these results published is more difficult for authors. This creates publication bias in systematic reviews resulting in effects that are overly beneficial. Based on the Oude Hengel et al study and the current level of theory and evaluation studies, it is not recommended to implement these interventions. Before embarking upon new RCT, it is good first to synthesize properly the available studies on sustained work ability in a systematic review and see what can be learned.

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