

Prevention of respiratory diseases

0021

Are particulate filtering respiratory masks class FFP2 effective to reduce inflammatory airways' reactions in poultry farmers? Results of a cluster-randomized controlled field study

Monika A. Rieger¹, Nicole Blomberg¹, Matthias Nübling², Monika Raulf³

¹*University Hospital of Tuebingen, Institute of Occupational and Social Medicine and Health Services Research, Tuebingen, Germany*

²*Research Centre for Occupational and Social Medicine (FFAS), , Freiburg, Germany*

³*Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, Allergology / Immunology, Bochum, Germany*

In occupational medicine, implementation of the consistent use of personal protective equipment (PPE) is one essential topic of health services research. Besides the behavioral change, evaluation should focus on the effectiveness of the PPE during use in practice which might be different from the efficacy proven in laboratory studies.

Due to often poor air quality in poultry farming, agricultural workers are recommended to use particulate filtering face-piece respirators (FFP2) as PPE for primary and secondary prevention of respiratory symptoms and diseases. While data exist on the filtering capacity of masks in general and with regard to dust derived from animal husbandry, results showing the effectiveness of the masks in field trials with regard to clinically relevant parameters are missing. This should be overcome by the present study.

Methods

In a cluster-randomized, controlled intervention study (cRCT) approved by the ethic committee of the University Witten/ Herdecke, the effectiveness of FFP2 masks for poultry workers was investigated in 2009. The introduction of masks was part of a complex intervention program (education on work-related risks, training, and free delivery of masks) in the intervention group (IG). The control group (CG) received education and training at the end of the study. The intervention period was 3 months \pm 14 days. Outcomes are changes in concentration of IL-8 and TNF-alpha in nasal lavage fluid (NALF) and amongst others, the use of masks. As moderating variables, sociodemographic data, activity history, pre-existing diseases, smoking status, type of occupancy and atopy status were recorded. The sample size calculation resulted in $n = 112$ (effect size 0.5, power 80%, alpha 0.5, intracluster correlation coefficient (ICC) = 0.01, drop-out 10%).

Results

89 workers from 47 poultry farms (IG: 22, CG: 25) were included after informed consent. Follow-up data were available from 75 (IG: 37 (current smokers (s): 8), CG: 38 (s: 4)) (mean drop-out 15.7%; IG: 17%, CG: 13.6%). Atopy status was similar in IG and CG.

On inclusion, both IG and CG indicated a rare use of masks ("daily": IG 5/37, CG: 7/38). After the intervention, IG reported significantly more often a daily use of masks than CG (34/37 vs. 8/38) ($\chi^2=38.18$, $p<0.001$). After intervention, so far no significant changes in IL-8 and TNF-alpha concentrations in NALF were found.

Conclusions

The field study, designed as cRCT, focused on the consistent implementation of FFP2 masks and the related effectiveness on several outcomes. Due to the realistic intervention, the IG's adherence to the intervention could only be observed indirectly via diaries. Despite little control, the use of the PPE increased significantly in the IG. Yet, the calculated sample size could not be achieved. In addition, there were more current smokers in IG than CG. Both factors might have contributed to the lack of proven effectiveness of FFP2 masks with regard to the inflammatory markers in NALF.