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Influenza vaccination as work stress prevention: Effects of a simple communication intervention on vaccination intentions among geriatric nurses

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ABSTRACT

Among geriatric nurses, influenza vaccination rates are often low, putting the health of nursing home residents and staff at risk. As well as protecting nurses against severe infection, vaccination also reduces virus transmission. Previous research has shown that explaining the prosocial effects of vaccination for the elderly can improve immunization intention. The present study investigated whether nurses were more willing to be vaccinated on learning that this would also help to protect colleagues, reduce sickness absence, and prevent work-related stress within the nursing team. A preregistered survey experiment in Germany (N = 92) found that informing participants about this stress-prevention effect strongly increased vaccination intention. While work-related stress was associated with lower vaccination intention, the experimental intervention seemed to mitigate this issue. Overall, the results suggest that communicating the positive externality of vaccination for the nursing team is a promising strategy for increasing uptake among geriatric nurses.

Seasonal influenza is an acute virus-based respiratory infection; symptoms include fever, dry cough, headache, and muscle and joint pain.[1] While most people recover without treatment, infection can lead to severe illness and death, especially among older people.[2] The influenza virus is easily transmitted to others nearby, promoting rapid spread in crowded settings such as nursing homes.[3] Vaccination against influenza helps to prevent infection and transmission and is recommended for older adults in the US and in most European countries.[4] However, as vaccine effectiveness typically decreases with age,[5] close contacts of older individuals should also be vaccinated. In Germany, it is recommended that nursing home staff should be vaccinated annually against the disease,[6] but survey data indicate that a majority of nurses remain unvaccinated.[7,8]

Vaccine hesitancy is a complex problem.[9] According to previous research, vaccination is unlikely when confidence in vaccine safety is low or vaccination is perceived as unnecessary.[10] For example, a UK study showed that healthcare workers were more likely to receive an influenza vaccine when they believed that influenza poses a risk to their health.[11] Mistrust in health authorities and the pharmaceutical industry as well as concerns about adverse events were also found to reduce the uptake of COVID-19 and influenza shots.[12,13] Beyond these considerations, practical constraints may discourage vaccination; for example, geriatric nurses may not have the time or energy to make and keep vaccination appointments because of work-related stress and shift work.[14] Vaccination intention is also influenced by perceptions of collective responsibility[15]; previous studies have found that people are more willing to be vaccinated on learning that this will protect both themselves and others who cannot be vaccinated or for whom vaccination is less effective such as infants, the elderly, or immunocompromised individuals.[16] However, in the case of geriatric nurses, vaccination has additional collective benefits. As well as protecting nursing home residents from infection, safeguarding their own health also helps to reduce sick leave and the associated stress for their colleagues.[17]

To investigate whether communicating this cooperative team benefit would increase influenza vaccination intention among nursing home employees, we performed a preregistered experiment. The experimental group was informed about the stress-preventing effect of vaccination while the control group received no such information. We hypothesized (H1) that the communication intervention would increase vaccination intention. Based on previous evidence that stress and strain may contribute to lower vaccination rates,[10] we further hypothesized (H2) that lower vaccination intention is associated with higher stress. As stressed individuals should be more motivated to prevent additional stress than those who are less stressed, we also

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hypothesized an interaction (H3): that communication of the stress-preventing effect should yield a stronger increase in vaccination intention among those with higher levels of work-related stress.

Method

Participants and research design

Employees of 25 residential care homes in the Hesse region of Germany were invited to participate in the study and 92 individuals completed the survey during July/August 2024. Respondents ranged in age from 19 to 67 years (M = 39.99 years, SD = 12.59 years); in total, 73 % identified as female, and 27 % identified as male. A majority (65 %) were geriatric nurses, and the rest were employed as nursing assistants.

Based on a one-factorial experimental design, participants were randomly assigned to one of two groups: those who received information about the stress-preventing effects of influenza vaccination (the *information group*; n = 48) and those who did not (the *control group*; n = 44). The two groups did not differ significantly in terms of age, gender, or employment ($p > 0.429$; see online supplement for details). While the sample size was smaller than preregistered (n = 114; https://aspredicted.org/YTD_Q4M), it was deemed sufficient for the detection of medium-sized effects in a multivariate linear regression of influenza vaccination intention on work stress, experimental manipulation, and their interaction ($f^2 = 0.15$, $\alpha = 0.05$, $1-\beta = 0.80$) as measured by G*Power 3.1.[18]

Materials and measures

Work-related stress

Work-related stress was assessed using a 10-item questionnaire measuring psychological stress in residential care settings as developed by the German professional association for health and welfare services.[19] Respondents were asked to rate a number of statements (e.g., “I often have the impression that I can’t do everything”; “Every now and then I lose my patience at work and get angry”; “I sometimes feel burnt out”) on a 7-point scale ranging from “does not apply at all” to “fully applies”. Responses were then averaged to calculate each participant’s stress level (Cronbach’s α = 0.88).

Experimental manipulation

Respondents in the *information* condition were asked to read the following text (translated from German): “Did you know? Annual vaccination against seasonal flu is recommended by the Robert Koch Institute for all healthcare workers. This serves to protect patients but also contributes to nurses’ own health and reduces overall staff workloads. By limiting outbreaks and medical leave, this helps to relieve the exhaustion of the working day during a flu epidemic. This relief is reflected in an overall improvement in the quality of care and can also help to enhance satisfaction and reduce nurses’ individual stress levels.”

Influenza vaccination intention

Vaccination intention was measured by asking participants how likely they were to be vaccinated against influenza before the coming winter (on a 7-point scale ranging from “very unlikely” to “very likely”).

Ethics and consent

The study followed the guidelines of the German Psychological Association. Ethical clearance was obtained from the University of Bamberg’s institutional review board (#2024–04/21), and all participants provided informed consent to use and share their data for scientific purposes without identity disclosure. Participation was anonymous.

Results

Vaccination intention was found to differ between the two groups. Overall, vaccination intention was much higher among those in the information group (M = 4.75, SD = 1.97) than in the control group (M = 2.27, SD = 1.93, Welch’s t (89.59) = 6.08, $p < 0.001$, d = 1.27), lending support to H1. Individual levels of work-related stress varied considerably, ranging from 1 to 6.4 on a 7-point scale (M = 4.22, SD = 1.24). Higher reported stress was associated with lower vaccination intention ($r = -0.27$, p = 0.009), supporting H2.

To assess whether the effect of experimental manipulation depended on the individual’s stress level, vaccination intention was regressed on experimental group, work-related stress (centered before analysis), and their interaction, and these predictors accounted for much of the variance in vaccination intention (R^2 = 0.32). In line with the above results, two significant main effects were observed; vaccination intention was increased by information about stress prevention (compared to the control group; b = 2.29, SE = 0.42, $p < 0.001$) and reduced by work-related stress ($b = -0.44$, SE = 0.26, p = 0.048). While visual inspection of the interplay between the two predictors suggests that providing the information may help to counter the negative effect of work stress on vaccination intention (Fig. 1), no statistically significant interaction could be found (b = 0.33, SE = 0.35, p = 0.174). As the interaction analysis may be underpowered,[20] we performed separate calculations of the correlation between work stress and vaccination intention for the two groups. One-sided tests revealed a significant correlation for the information group ($r = -0.26$, p = 0.046) but not for the control group ($r = -0.07$, p = 0.305), lending some support to H3.

Discussion

Surveys have repeatedly reported low influenza vaccination rates among geriatric nurses, putting the health of nursing home residents

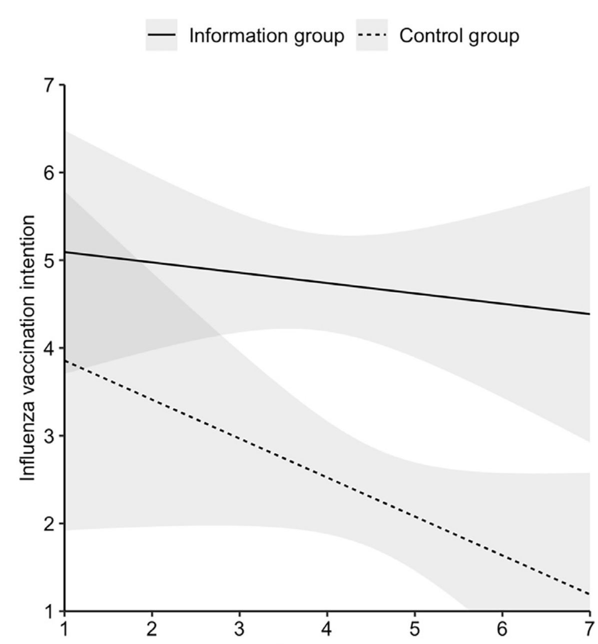

Fig. 1. Effects of experimental manipulation, work stress, and their interaction on influenza vaccination intention.

Note: Results from linear regression; the gray ribbons represent 95 % confidence intervals.

and staff at risk.[7,8] Previous research indicates that reasons for low uptake are complex and involve factors such as limited access, mistrust in vaccine safety and efficacy, and the underestimation of disease risks.[21,22] While various interventions were designed to address these issues, ranging from individual risk appeals to financial incentives,[23,24] recent work indicates that increasing awareness of the prosocial effects of vaccination could promote uptake as well.[16] In the case of geriatric nurses, vaccination protects nursing home residents by reducing pathogen transmission. However, vaccination can also help to reduce staff sickness absences and any associated stress within the nursing team.[17] In the present study, we found that providing information about this stress-preventing effect strongly increased vaccination intention. Interestingly, the results suggest that while a-priori work stress is associated with lower vaccination intention, the communication intervention may help to counter this effect.

Overall, the results indicate that communicating the benefits of vaccination is a promising strategy for increasing uptake among team colleagues in geriatric nursing settings. In the analysis, the communication intervention, work-related stress, and their interaction explained about a third of the variance in vaccination intention, highlighting the strong influence of practical constraints on the vaccination decisions made by healthcare workers. While previous research has often focused on risk perceptions (e.g., disease probability and vulnerability; vaccine safety and efficacy), the present results indicate that vaccination intention decreases at higher levels of stress but increases when vaccination is framed as a means of mitigating future stress.

While our findings align with previous evidence that explaining herd immunity can strengthen vaccine advocacy,[25,26] some caution is required in generalizing the results. First, as vaccination intention may differ from real behavior,[27] the effectiveness of this form of communication intervention remains to be validated by uptake data from future studies. Second, as our sample was quite small; no robust interaction effect could be observed between intervention and level of work-related stress. Furthermore, participants may have been more inclined to vaccination than non-participants because of a self-selection bias. Securing the participation of more nurses would improve the analytical power and validity of future research; for now, the observed strong positive effect of our communication intervention on vaccination intention can be considered robust. If any, the effect may be underestimated given that participants from the intervention group may have talked with later control group participants about the stress-preventing effect of vaccination. Third, as the results refer only to German geriatric nurses, future studies should investigate whether the observed communication effect can be generalized to other countries and professions. For instance, communicating the stress-preventing benefits of vaccination might also increase uptake among clinical doctors and other essential public service workers (e.g., police, firefighters). Finally, it is important to note that the strong effect of the reported communication intervention may relate to the emphasis on positive externalities for residents. As well as describing the positive effects of vaccination on nursing team stress reduction, the information provided also highlighted how vaccination protects the elderly, and this may have contributed to the observed increase in vaccination intention. However, as that information was repeatedly emphasized during the recent coronavirus pandemic, it should be familiar to most participants and seems unlikely to explain the observed effect. Nevertheless, from a practical perspective, it makes sense to communicate all the positive externalities of vaccination.

In conclusion, the present findings support the view that communicating the stress-preventing effects of influenza immunization can help to promote vaccination intention and uptake in nursing teams. Many nursing home employers already organize influenza vaccination days for residents and employees; when announcing these events, employers should remind workers of the positive effects of vaccination, including both personal protection and reduced transmission to residents and colleagues. Similarly, vaccinated nurses should be encouraged to persuade hesitant colleagues by describing their experiences of increased work-related stress when other team members take sick leave because of a preventable influenza infection. Our results suggest that this argument may have a significant impact on vaccination intention, especially in highly stressful environments.

Online supplement

Materials, data, and the data analysis script are available at http://dx.doi.org/10.17605/OSF.IO/X3WQ2

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Philipp Sprengholz: Writing – original draft, Investigation, Writing – review & editing, Methodology, Conceptualization. **Jessica van den Bergh:** Writing – review & editing, Investigation, Conceptualization, Methodology, Data curation.

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