International Journal of Nursing Studies 51 (2014) 1321–1331

Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns

# Comparative cost-effectiveness of two interventions to promote work functioning by targeting mental health complaints among nurses: Pragmatic cluster randomised trial

Cindy Noben [a,b,*], Filip Smit [a,c], Karen Nieuwenhuijsen [d], Sarah Ketelaar [d], Fania Gärtner [d], Brigitte Boon [a], Judith Sluiter [d], Silvia Evers [a,b]

[a] Department of Public Mental Health, Trimbos Institute, Netherlands Institute of Mental Health and Addiction, Utrecht, Netherlands
[b] Department of Health Services Research, CAPHRI School of Public Health and Primary Care, Maastricht University, Maastricht, Netherlands
[c] Department of Epidemiology and Biostatistics, EMGO+ Institute of Health and Care Research, VU University Medical Centre, Amsterdam, Netherlands
[d] Coronel Institute of Occupational and Environmental Health, Academic Medical Centre, Amsterdam, Netherlands

ARTICLE INFO

*Article history:*
Received 1 July 2013
Received in revised form 30 January 2014
Accepted 31 January 2014

*Keywords:*
Cost effectiveness
Mental disorders
Nurses
Occupational health
Prevention and control
Randomised controlled trial
Stress
Work functioning

ABSTRACT

*Background:* The specific job demands of working in a hospital may place nurses at elevated risk for developing distress, anxiety and depression. Screening followed by referral to early interventions may reduce the incidence of these health problems and promote work functioning.
*Objective:* To evaluate the comparative cost-effectiveness of two strategies to promote work functioning among nurses by reducing symptoms of mental health complaints. Three conditions were compared: the control condition consisted of online screening for mental health problems without feedback about the screening results. The occupational physician condition consisted of screening, feedback and referral to the occupational physician for screen-positive nurses. The third condition included screening, feedback, and referral to e-mental health.
*Design:* The study was designed as an economic evaluation alongside a pragmatic cluster randomised controlled trial with randomisation at hospital-ward level.
*Setting and participants:* The study included 617 nurses in one academic medical centre in the Netherlands.
*Methods:* Treatment response was defined as an improvement on the Nurses Work Functioning Questionnaire of at least 40% between baseline and follow-up. Total per-participant costs encompassed intervention costs, direct medical and non-medical costs, and indirect costs stemming from lost productivity due to absenteeism and presenteeism. All costs were indexed for the year 2011.
*Results:* At 6 months follow-up, significant improvement in work functioning occurred in 20%, 24% and 16% of the participating nurses in the control condition, the occupational physician condition and the e-mental health condition, respectively. In these conditions the total average annualised costs were €1752, €1266 and €1375 per nurse. The median incremental cost-effectiveness ratio for the occupational physician condition versus the control condition was dominant, suggesting cost savings of €5049 per treatment responder. The incremental cost-effectiveness ratio for the e-mental health condition versus the control condition was estimated at €4054 (added costs) per treatment responder. Sensitivity analyses attested to the robustness of these findings.

* Corresponding author at: P.O. Box 616, 6200 MD Maastricht, Netherlands. Tel.: +31 43 38 81834; fax: +31 43 38 84162.
*E-mail address:* c.noben@maastrichtuniversity.nl (C. Noben).

0020-7489/$ – see front matter 
http://dx.doi.org/10.1016/j.ijnurstu.2014.01.017

*Conclusions:* The occupational physician condition resulted in greater treatment responses for less costs relative to the control condition and can therefore be recommended. The e-mental health condition produced less treatment response than the control condition and cannot be recommended as an intervention to improve work functioning among nurses.


**What is already known about the topic?**

- Nurses are at elevated risk for distress, anxiety and depression due to work characteristics such as high job demands and a lack of autonomy.
- Nurses with poor mental health experience significantly more medical errors.
- Worker Health Surveillance is a preventive strategy that aims at the early detection of negative health effects at work.

**What this paper adds**

- Screening and feedback followed by e-health was not a success due to low uptake rates.
- Screening and feedback followed by referral to the occupational physician for nurses at risk improved work functioning in a cost-effective way.
- The intervention costs for screening and feedback followed by referral to the occupational physician for nurses at risk were more than recouped within 6 months.

## 1. Introduction

Nurses are at elevated risk for mental distress, anxiety and depression (Campo et al., 2009; Gartner et al., 2010; Magnavita and Heponiemi, 2012; Suresh et al., 2013). Possible explanations for this increased risk are found in work characteristics such as high job demands and a lack of autonomy (Gartner et al., 2010; Tayler, 1992). Poor mental health is not only undesirable in its own right, but will likely also have an adverse impact on the nurses' job functioning and may thus jeopardise the health and safety of the patients in their care. After all, nurses with poor mental health experience significantly more medical errors (Gartner et al., 2010; Karsh et al., 2006; Suzuki et al., 2004). For these reasons it is imperative to protect and promote mental health in nurses, and to monitor and safeguard the quality of their functioning at work (Gartner et al., 2010).

Mental disorders carry substantial disease and economic burdens. Preventive interventions for mental disorders exist; however, what interventions should be financed and implemented is an issue that needs to be addressed by decision makers. Moreover, the number of health-economic evaluations that were conducted in the work setting is very limited. Likewise, information to aid in the transferability of available results to different contexts and settings is limited (Zechmeister et al., 2008). Economic evaluations can provide answers, select interventions that are cost-effective and avoid wasting limited resources. An approach to priority setting is largely based on economic techniques to assess the cost-effectiveness to answer questions regarding the economic value for money of competing interventions (Drummond et al., 1993; Tompa et al., 2006).

Periodic screening might be useful to identify nurses with signs of mental health problems and encourage help-seeking behaviour. To that end a Worker Health Surveillance was developed. The Worker Health Surveillance is a preventive strategy that aims at the early detection of negative health effects at work (Gartner et al., 2010, 2012a; ILO, 1998). A Worker Health Surveillance with personalised feedback and referral to dedicated early interventions for screen positives might be a successful strategy to prevent the onset and further deterioration of mental health problems and to reduce impairments in work functioning (Gartner et al., 2010; Koh and Aw, 2003). In this study we compare a control condition consisting of screening without feedback versus Worker Health Surveillance screening with feedback plus referral for a consultation with an occupational physician or referral to preventive e-mental health interventions. These approaches have not been evaluated from a health-economic perspective.

Therefore, the aim of this study is to assess the comparative cost-effectiveness of the occupational physician condition and the e-mental health condition versus the control condition, with a view to protecting mental health and improving and sustaining work functioning in nurses.

## 2. Methods

### 2.1. Design

The *Mental Vitality @ Work* study (Gartner et al., 2011a) was designed as a pragmatic cluster randomised controlled trial, with randomisation at the level of hospital wards to three conditions:

1 Screening and feedback followed by referral to the occupational physician for screen-positives (the occupational physician condition),
2 Screening and feedback followed by referral and access to preventive e-mental health interventions (the e-mental health condition),
3 Screening without feedback and without referral to either the occupational physician or the e-mental health interventions (the control condition).

Data were recorded at baseline and after three and 6 months. In the economic evaluation, we assessed the comparative cost-effectiveness in two contrasting scenarios: (1) the occupational physician condition versus the control condition, and (2) the e-mental health condition versus the control condition. A medical ethics committee approved the study.