

The effect of a short educational intervention in social insurance medicine: A randomized controlled trial

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Abstract

Aim: To evaluate the effect of an educational intervention in social insurance medicine with Registered Nurses.

Design: Randomized controlled trial.

Methods: The trial was performed in 20 primary healthcare centres in Central Sweden. The centres were randomly assigned as intervention or control. All Registered Nurses working with telephone nursing at the centres were invited ($N = 114$); out of these 100 agreed to participate and responded to a questionnaire at the beginning and end of the trial. Fourteen questions in the questionnaire dealt with professional background and were used as exposure variables and were analysed using nominal logistic regression.

Results: Registered Nurses in the centres randomly assigned for the intervention experienced handling sick leave questions as less problematic after the intervention than those in the control group. This indicated that the intervention was associated with a positive effect. However, due to the rather small study population, the effect was inconclusive.

KEYWORDS

cluster randomized controlled trial, primary health care, sick leave, social insurance medicine, telephone nursing

1 | BACKGROUND

Telephone nursing is performed by Registered Nurses (RNs) in many settings, one of which is in primary healthcare centres (PHCCs) in Sweden (Kaminsky, Röing, Björkman, & Holmström, 2017). Among the topics of telephone calls, are questions related to sick leave, referred to in this research as "sick leave questions" (SLQs) (Lännerström, Holmström, Svärdsudd, & Wallman, 2017; Lännerström, Wallman, & Söderbäck, 2012; Lännerström, von Celsing, Holmström, & Wallman, 2017; Müssener & Linderoth, 2009). Telephone nursing is known to be a difficult and demanding task that requires not only updated knowledge of evidence-based medicine and nursing, the

care system, regulations and local routines but also skills in communication to provide optimal care to the patient (Greenberg, 2009; Holmström & Höglund, 2007; Holmström, Gustafsson, Wesström, & Skoglund, 2019; Kaminsky, Rosenqvist, & Holmström, 2009; Kaminsky et al., 2017; Leppänen, 2010). Callers wish for telephone nurses to be calm, clear and competent. Clarity was described as distinct, concrete and practical advice on how to act, what to observe and where to seek further assistance (Gustafsson, Walivaara, & Gabrielsson, 2019).

There are currently only a few studies on RNs' engagement and participation with SLQs in telephone nursing and the problems and benefits connected to this task (Lännerström, Holmström, et

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al., 2017; Lännerström et al., 2012; Lännerström, Celsing, et al., 2017; Müssener & Linderoth, 2009). Problems of handling SLQs have been described as related to giving information about social insurance regulations and knowing where to refer patients and how to handle dissatisfied patients (Lännerström, Celsing, et al., 2017). There is extensive research showing that physicians and especially general practitioners experience work related to sickness certification as problematic (Arrelöv et al., 2007; Carlsson, Lännerström, Wallman, & Holmström, 2015; Foley, Thorley, & Denny, 2012; Hussey, Hoddinott, Wilson, Dowell, & Barbour, 2004; Läkare sjukskrivningspraxis, 2010; Ljungquist et al., 2012; Money, Hussey, Thorley, Turner, & Agius, 2010). Physicians have expressed a great need for education and training in social insurance medicine (Hussey et al., 2004; Löfgren, Hagberg, & Alexanderson, 2010; Money et al., 2010).

To our knowledge, there is only one published study of RNs describing the experience of undergoing education in social insurance medicine (Müssener & Linderoth, 2009) and none with other professionals. In two previous studies, the current researchers mapped RNs' knowledge regarding SLQs and identified a need for further training in this area (Lännerström, Holmström, et al., 2017; Lännerström et al., 2012; Lännerström, Celsing, et al., 2017). However, the education of professionals in social insurance medicine is only sparsely described in the research literature and it is uncommon that RNs participate in such educations or interventions.

Thus, there is a need to educate and train RNs in social insurance medicine to enable an increased quality of care. The aim of this study was to evaluate the effect of an educational intervention in social insurance medicine for RNs, who experienced problems with sick leave questions in telephone nursing. The research question was: "What effect can a short educational intervention have on the experience of handling sick leave questions?"

1.1 | Design and method

The study was a randomized controlled trial performed in 20 primary healthcare centres in Sweden. The study population has been described previously (Lännerström, Holmström, et al., 2017). Briefly, managers of 26 PHCCs in one county of Central Sweden were contacted to request their organization's participation in the study, Figure 1 (Lännerström, Celsing, et al., 2017). They were informed that the study was part of a County Council investment to educate RNs who work in telephone nursing on social insurance medicine.

Twenty PHCCs, which operated privately ($N = 4$) or by the County Council ($N = 16$), agreed to participate. The RNs at these PHCCs ($N = 185$) were asked to complete a questionnaire containing 120 questions on occupational background and on matters dealing with telephone nursing. Completed questionnaires were received from 114 of 185 RNs at the PHCCs. These RNs were invited to volunteer for a randomized controlled trial, 100 RNs from the 20

PHCCs agreed to participate. Fifty-nine RNs worked in a PHCC that was designated for the intervention and 41 in a PHCC that was a control. Six months later, the intervention was completed and the same questionnaire was distributed again to determine the effect of the intervention. Informed consent was sought from the PHCC managers before distributing the questionnaires and from the RNs before they completed the questionnaire.

1.1.1 | Educational intervention

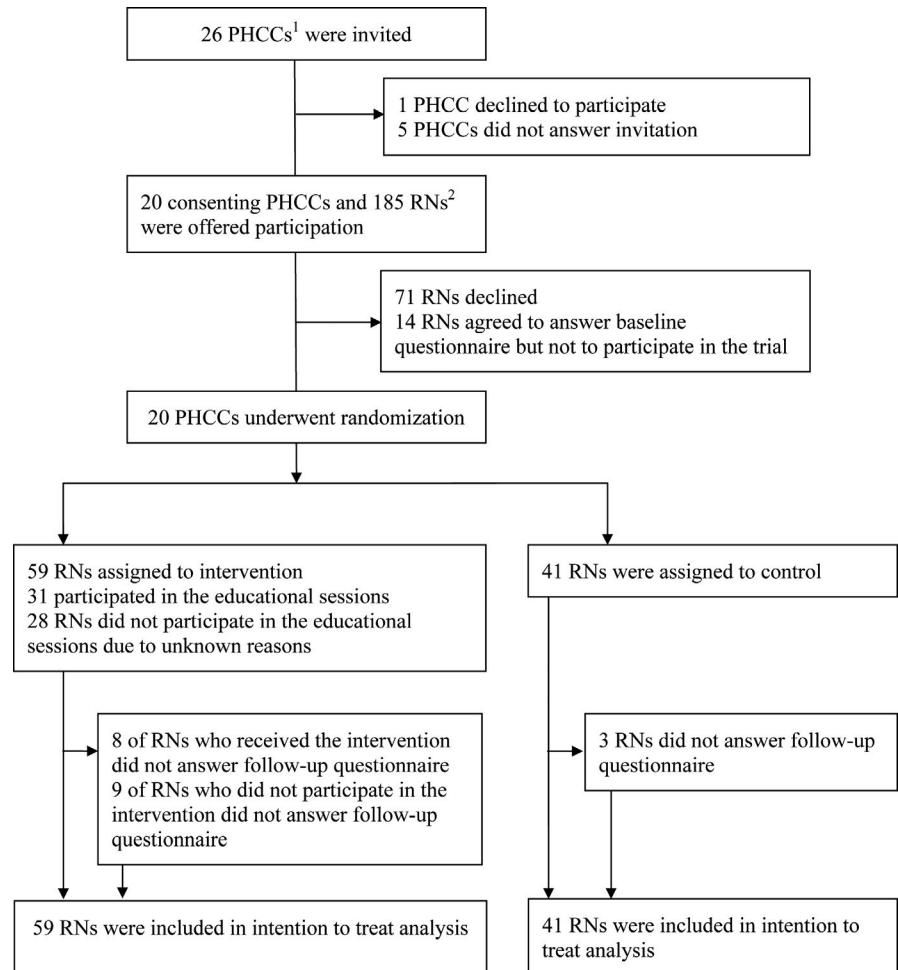
The Committee of Social Insurance Medicine in the County Council commissioned one of the authors to arrange education in social insurance medicine for the participating RNs. A group of clinicians and researchers developed, feasibility tested, evaluated and implemented the educational programme. To enhance the learning, a combination of lecture and reflection sessions was chosen as a strategy to connect theoretical knowledge with examples from the participants' clinical practice. Active learning methods in combination with lectures have been shown to have greater impact on behaviour than passive methods (Grimshaw et al., 2001). The intervention had some restrictions. First, the County Council required that *all* RNs working with telephone nursing at PHCCs be offered a short educational and training programme in social insurance medicine. This was overcome by providing the control group with the same educational intervention at the conclusion of the trial. The second restriction was that the educational intervention could not exceed a total of eight working hours.

The intervention was comprised of two four-hour sessions: Session 1 and Session 2. Between the two sessions, the participants were asked to describe and reflect on a telephone call, in writing, that contained a sick leave question. Their reflections were used in group discussions in Session 2, which took place one month after Session 1. The educational part of the intervention included the RN's role in handling sick leave questions, the physician's and the rehabilitation coordinator's roles in the same, the laws and regulations surrounding these roles, the role of the Social Insurance Agency and risk factors for long-term sick leave. A more detailed description of the intervention is presented in the previous research (Lännerström, Wallman, Kaminsky, & Holmström, 2018).

1.1.2 | Statistical considerations

Data were analysed with the Statistical Analysis System (SAS) software package, Version 9.3. Among the responses, 0.3% of the data in the questionnaire were missing on average. To avoid the exclusion of randomized observations in the analyses, missing values were replaced with the means of observations with non-missing values in the corresponding variables—a standard procedure in this type of study.

The analyses were performed according to the intention to treat protocol, which means that all subjects were analysed according to the group they were assigned, whether or not they participated in

FIGURE 1 Flow diagram of inclusion.¹PHCC = primary healthcare centre;²RN = Registered nurse

the social insurance education and whether or not they responded to the follow-up questionnaire. In the latter case, no change from the baseline questionnaire was assumed to have occurred.

Three analysis models were tested with nominal logistic regression. To measure change of the outcome variable across time, “experienced problems with sick leave questions in telephone nursing at follow-up” was used as an outcome variable and “experienced problems with sick leave questions in telephone nursing at baseline” as an exposure variable in all models to avoid wide standard deviations associated with delta variables (differences). The outcome variable was a dichotomization of the question “How often do you find it problematic to handle SLQs?” It was dichotomized into “less than once a week” (no problem = 0) and “once a week or more often” (problem = 1). Possible responses were: “never,” “a few times a year,” “a few times a month,” “1–5 times a week,” “6–10 times a week” and “more than 10 times a week.” Two ways of dichotomizing the variable were tested previously and both performed in approximately the same way (1).

In Model 1, analyses were made with the exposure variables “intervention versus control group,” the five significant variables in Table 1 (“age at baseline,” “worked with telephone nursing ≥ 6 years,” “worked with telephone nursing $\geq 50\%$ of working hours,” “workplace

has a policy for handling sick leave,” “gets no support from managers”) and “experienced problems with sick leave questions in telephone nursing at baseline.”

In Model 2, non-significant exposure variables from Model 1, except for “intervention versus control group” were backward eliminated. In Model 3, “intervention versus control group,” “experienced problems with sick leave questions in telephone nursing at baseline” and a propensity score (based on the five significant variables in Table 1) were used as exposure.

The degree of explanation in the model, whether measured as the agreement between predicted probabilities and observed responses, or as the C-index statistic, was an excellent 80%–85%. Only two-tailed tests were used. p -values $< .05$ were considered, indicating significance.

1.2 | Ethics

The study followed *The Declaration of Helsinki* (World Medical Association, 2013) and was approved by the Regional Research Ethics Board in Uppsala, Sweden (Dnr 2014/156).

	Intervention group, N (%)		Control group, N (%)		p
	N	Mean(SD) or %	N	Mean(SD) or %	
N	59	100	41	100	–
Age, years		50.6 (10.3)		45.5 (9.7)	<.05
Women, %	56	94.9	41	100.0	n.s.
Participated in educational intervention					
Both educational sessions, %	28	47.5	0	0	
One educational session only, %	3	5.1	0	0	
Has a specialist nursing degree, %	46	78.0	26	63.4	n.s.
Has worked with telephone nursing ≥6 years, %	38	64.4	19	46.3	<.05
Worked in county council-operated primary healthcare centre, %	46	78.0	37	90.2	n.s.
Working full-time, %	35	59.3	26	63.4	n.s.
Telephone nursing ≥50% of working hours, %	42	71.2	19	46.3	<.05
Own sick-listing >7 days during last 5 years, %	31	52.5	19	46.3	n.s.
Workplace policy for handling sick leave, %	29	49.2	33	80.5	<.005
Handling sick leave questions is not a work environmental problem for me, %	23	39.0	18	43.9	n.s.
Gets no support from managers, %	12	20.3	2	4.9	<.005
Has a role in health care of sick- listed patients, %	40	67.8	28	68.3	n.s.
Educated in social insurance medi- cine, %	2	3.4	1	2.4	n.s.
Telephone calls with sick leave ques- tions once a week or more often, %	53	89.8	39	95.1	n.s.
Measures in telephone calls with sick leave questions taken often or always					
Making physician telephone ap- pointments, %	21	35.6	22	53.7	n.s.
Solving problems, %	15	25.4	6	14.6	n.s.
Referral to other staff, %	3	5.1	6	14.6	n.s.
Other measures, %	4	6.8	4	9.8	n.s.
Providing information, %	2	3.4	2	4.9	n.s.
Experienced problems with sick leave questions in telephone nurs- ing at baseline, %	35	59.3	32	78.0	n.s.
Experienced problems with sick leave questions in telephone nurs- ing at end of follow-up, %	34	57.6	31	75.6	n.s.

TABLE 1 Baseline and follow-up characteristics of the study population

2 | RESULTS

Baseline characteristics of the study population are given in Table 1. Out of the 59 RNs in the intervention group, 28 participated in both educational sessions, three participated in only one session and 28 declined to participate in the educational sessions

due to unknown reasons. There were significant differences between the intervention group and the control group regarding several variables, some favouring the control group and some the intervention group. All the differences were collected into one measure, the propensity score. The control group showed a propensity score of 0.35 (*SD* 0.25) and the intervention group score was 0.75 (*SD* 0.24)—a difference taken into account in the analysis.

TABLE 2 Results of the randomized controlled trial on outcome (the effects on experienced problems with sick leave questions in telephone nursing) according to the intention to treat protocol analysis strategy according to the three analytical models

Model	Exposure	Estimate (SE)	Wald's χ -square	Degree of explanation	Odds ratio	95% confidence interval	p
Full model (Model 1)	Intervention versus control group	-0.7052 (0.64)	1.20	84%	0.49	0.14-1.74	.27
	Age at baseline	-0.0362 (0.03)	1.38		0.96	0.91-1.03	.24
	Has worked with telephone nursing ≥ 6 years	0.6260 (0.35)	3.13		1.87	0.94-3.74	.08
	Telephone nursing $\geq 50\%$ of working hours	-0.1646 (0.57)	0.08		0.85	0.28-2.57	.77
	Work place policy for handling sick leave	-0.4768 (0.95)	0.25		0.62	0.10-4.00	.62
	Gets no support from managers	-0.3123 (0.45)	0.49		0.73	0.31-1.76	.49
	Experienced problems with sick leave questions at baseline	2.7927 (0.62)	20.09		16.33	4.81-55.38	<.0001
Full model with backward elimination (Model 2)	Intervention versus control group	-0.4992 (0.53)	0.89	80%	0.61	0.22-1.71	.35
	Experienced problems with sick leave questions at baseline	2.5375 (0.52)	24.22		12.65	4.60-34.75	<.0001
Model with propensity score (Model 3)	Intervention versus control group	-1.1395 (0.71)	2.6	84%	0.32	0.08-1.28	.11
	Experienced problems with sick leave questions at baseline	2.6900 (0.55)	24.33		14.73	5.06-42.90	<.0001
	Propensity score	1.6022 (1.15)	1.94		4.96	0.52-47.24	.16

The result of the logistic regression analysis is presented in Table 2. In Model 1, the odds ratio of the intervention was 0.49 ($p = .27$) with a degree of explanation of 84%. In Model 2, the odds ratio was 0.61 ($p = .35$), with an 80% degree of explanation. In Model 3, the odds ratio was 0.32 ($p = .11$), with an 84% degree of explanation. The high degrees of explanation in all three models indicate that the intervention group experienced less problems with SLQs after the intervention than the control group. However, the odds ratio was inconclusive.

No a priori power analysis was performed during the planning phase of the study, since there were no previously published randomized controlled trials in this research area, which made an a priori analysis difficult. A post hoc power analysis, based on the findings in the study, showed that the power based on the 100 subjects was 71%. For an 80% power and a significant result, 123 subjects would be needed.

3 | DISCUSSION

Registered Nurses in the PHCCs randomly assigned for the intervention experienced handling SLQs as less problematic after the intervention than those in the control group. However, due to a too small number of subjects (illustrated by the post hoc power analysis) the odds ratio was inconclusive, $p = .11$.

We found no previous randomized controlled studies on this subject and only one descriptive study, prohibiting comparison to previous research. The only study found was a descriptive,

qualitative study (Müssener & Linderöth, 2009) that described RNs' experiences after undergoing an education programme in social insurance medicine where the participants' experience of fewer problems in relation to sick leave was not mentioned, but participants stressed that the education had been perceived as very useful for their work. A more cost-effective way to provide basic knowledge in this area could be to create a web-based education programme.

As described previously, several studies among RNs, but more among physicians (Lännerström, Celsing, et al., 2017), disclosed a large need for education in social insurance medicine, since the lack of knowledge causes problems in relation to SLQs and sickness certifications. The results in the present study indicate a positive effect with only a short intervention, but due to a somewhat small study population, the results were inconclusive. One might argue that a power analysis should have been made beforehand. The reason for not doing this was that we aimed for a total sample of all PHCCs in the county under study. A long-term effect of reducing the problems RNs experience regarding social insurance and sick leave would most likely be a better work environment. In turn, this might have an impact on the patients calling with SLQs in a positive way, as callers' expect clarity from telephone nurses (Gustafsson et al., 2019). What parts of the intervention were most useful for the participants, the education or the reflection, is, so far, unknown and will be explored further in a process evaluation (Lännerström et al., 2018).

In this study, cluster randomization was used, which means that their PHCCs, rather than individual RNs, were randomized into intervention or control PHCCs. This type of randomization

has advantages and disadvantages. Cluster randomization causes larger odds ratio confidence intervals due to unexplained variance. The alternative, individual randomization, would mean that some RNs in a PHCC might be randomized to education, while others would not, increasing the risk of so-called contamination of the educational message from RNs under education to control RNs. In a situation like the one in this study, cluster randomization is the preferred choice.

An ideal randomized controlled study should include a minimum of 300 subjects to get equal values in all risk-affecting variables (exposure), measured or unmeasured. In studies with smaller study populations, there will always be differences in exposure, either favouring the intervention or the control group. In the 1980s, the propensity score was proposed as a way of creating balanced case-control studies within cohort studies—so-called nested case-control studies. A propensity score might also be used in randomized trials with small study populations to adjust for exposure differences between the intervention group and the control group.

Change of experienced problems might be measured as a delta variable (difference between baseline and follow-up levels). However, delta variables are associated with wide dispersions (standard deviations). To overcome this problem, we used the follow-up level as a y-variable and the baseline level as an x-variable, which produces a difference with a much narrower dispersion.

For the main analysis in this study, three variations of nominal logistic regression were used. First, all significant exposure variables from Table 1 were kept in the analysis throughout. In the second variation, backward elimination of non-significant variables from the first analysis was used. In the third variation, a propensity score was used to capture all differences regarding exposure variables between the intervention group and the control group, thereby making backward or other eliminations unnecessary. All three variations showed similar results, even though the analysis using the propensity score showed the strongest results, since only three exposure variables were at hand—intervention/control, experienced problems with sick leave questions at baseline and propensity score.

What do the results of this study mean? If the results had been conclusive, it would mean that a modest input of social insurance medicine education among RNs active in telephone nursing would, to a large extent, diminish perceived problems regarding social insurance issues. In the future, the effect might be shown with a larger study population.

3.1 | Strengths and limitations

The strengths of this study include that it appears to be the first of its kind and that it was performed in primary health care, where most sick-listings are performed. The limitations include that the study population was too small to demonstrate conclusive results. Another 23 participants would probably have been enough, according to the power analysis.

4 | CONCLUSIONS

Social insurance medicine education exhibited a positive effect in this randomized controlled trial as measured by the odds ratio. However, due to the rather small study population, the effect was inconclusive.

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CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

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