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Tekniske målinger under patientforflytning og viden om barrierer for brug af hjælpemidler:

Omsætning til god praksis på danske hospitaler

Jonas Ørts Vinstrup, PhD

AMFF konference, 4/6 2025

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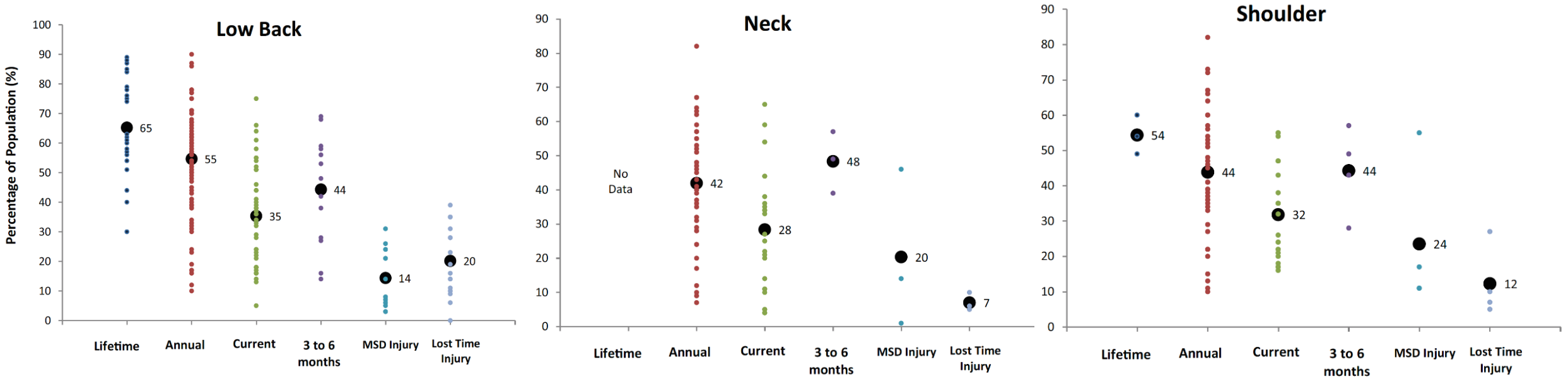
What seems to be the problem here?



"The reported **prevalence of pain** is higher among healthcare workers compared with other groups of the working population (Cohen-Mansfield et al., 1996; Guo et al., 1995; Yang et al., 2016), and the **frequency of back injuries** have been reported to be six times that of other professions (Cohen-Mansfield et al., 1996)."

Davis and Kotowski, 2015; Vinstrup et al., Cohen-Mansfield et al., 1996, Yang et al., 2016

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One (risk factor) to rule them all?

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Physical exposure

Original article

Scand J Work Environ Health. 2021;47(4):287–295. doi:10.5271/sjweh.3954

Combined ergonomic exposures and development of musculoskeletal pain in the general working population: A prospective cohort study

by Lars L Andersen, PhD,[1,2] Jonas Vinstrup, PhD,[1] Emil Sundstrup, PhD,[1] Sebastian V Skovlund, MSc,[1] Ebbe Villadsen, BSc,[1] Sannie V Thorsen, PhD [1]

Workplace
Original article

Cumulative mechanical low-back load at work is a determinant of low-back pain

Pieter Coenen[1, 2], Idsart Kingma[1, 2], Cécile R L Boot[2, 3], Paulien M Bongers[2, 4], Jaap H van Dieën[1, 5]

› Front Public Health. 2024 Nov 25:12:1459595. doi: 10.3389/fpubh.2024.1459595. eCollection 2024.

Review Article

Occupational Safety and Health Among Young Workers in the Nordic Countries: A Systematic Literature Review

Therese N. Hanvold [1,*], Pete Kines [2], Mikko Nykänen [3], Sara Thomée [4], Kari A. Holte [5], Jukka Vuori [3], Morten Wærsted [1], Kaj B. Veiersted [1]

Ergonomic challenges in healthcare: mapping physical load during patient transfers using electromyographic field measurements

Jonas Vinstrup [1], Markus Due Jakobsen [1], Anders Bruun Nielsen [1], Lars Louis Andersen [1 2]

Review

The effect of lifting during work on low back pain: a health impact assessment based on a meta-analysis

Pieter Coenen[1], Vincent Gouttebarge[2], Aafje S A M van der Burght[3], Jaap H van Dieën[1], Monique H W Frings-Dresen[2], Allard J van der Beek[4], Alex Burdorf[5]

Review

Scand J Work Environ Health 1997;23(4):243-256
doi:10.5271/sjweh.217

Positive and negative evidence of risk factors for back disorders

by Burdorf A, Sorock G

Andersen et al., 2021; Badarin et al., 2021; Coenen et al., 2014; Møller et al., 2019; Oakman et al., 2017; Burdorf & Sorock, 1997; Coenen et al., 2014; Hanvold et al., 2019.

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Physical exposure

Table - Combined ergonomic exposures and changes in neck-shoulder and low-back pain intensity

C	N	%	Ergonomic factors (percentage of working time)						
			Walking, standing	Arms above shoulder	Repetitive arm movement	Back twisted, bent	Lifting, carrying	Pushing, pulling	Kneeling, squatting
1	359	1.9	94	67	65	82	82	76	51
2	423	2.2	90	40	83	82	50	25	16
3	946	5.0	82	24	15	33	65	30	26
4	923	4.9	80	24	13	66	21	22	20
5	527	2.8	93	20	72	20	34	26	12
6	698	3.7	26	10	74	16	8	5	4
7	4381	23.2	45	10	5	11	12	9	8
8	3912	20.7	86	12	6	13	14	12	12
9	6736	35.6	20	3	2	4	3	1	1

*"The main finding of this study is that **combined occupational ergonomic exposures** play an important role in the development of musculoskeletal pain.*

*Specifically, **clusters characterized by several combined ergonomic exposures for a relatively high percentage of the working time showed the largest increase in pain intensity** from baseline to follow-up."*

- Andersen et al., 2021

Andersen et al., 2021; Badarin et al., 2021; Coenen et al., 2014; Møller et al., 2019; Oakman et al., 2017; Burdorf & Sorock, 1997; Coenen et al., 2014; Hanvold et al., 2019.

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Ok, but what about healthcare workers?

"From this analysis, it appears that patient lifting frequency is indeed a causative factor in the production of low-back injuries in nursing personnel." (Stobbe et al., 1988).

Stobbe et al., 1988; McAbee, 1988; Owen, 1989; Owen and Garg, 1991; Skovron et al., 1987.

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Patient transfer and risk of back injury

Frequency of patient transfer

Table 2. Odds ratios (OR) for back injury from frequency of patient transfers among the total cohort of healthcare workers (N=5017). [95% CI=95% confidence interval]

	N	Model 1 [a]		Model 2 [b]		Model 3 [c]	
		OR	95% CI	OR	95% CI	OR	95% CI
Patient transfers							
<1 per day	1187	1.00		1.00		1.00	
1–2 per day	1097	1.66	1.00–2.77	1.66	1.00–2.77	1.75	1.05–2.93
3–10 per day	1944	2.06	1.33–3.20	1.91	1.22–2.98	1.81	1.14–2.85
>10 per day	789	1.85	1.15–2.97	1.69	1.05–2.74	1.56	0.96–2.54

*"**Daily patient transfer** was associated with increased risk of back injury among healthcare workers.*

***Persistent use of assistive devices** was associated with reduced risk of back injury among healthcare workers with daily patient transfers"*

- Andersen et al., 2014

Use of assistive devices

Table 3. Odds ratios (OR) for accidental back injury from use of assistive device and transferring patients alone among healthcare workers with daily patient transfer (N=3820). [95% CI=95% confidence interval]

	N	Model 1 [a]		Model 2 [b]		Model 3 [c]	
		OR	95% CI	OR	95% CI	OR	95% CI
Use of assistive device							
Sometimes	790	1.00		1.00		1.00	
Often	1178	0.56	0.34–0.92	0.55	0.34–0.92	0.59	0.36–0.98
Very often	1852	0.60	0.37–0.96	0.60	0.37–0.97	0.62	0.38–1.00

*"The study indicates that **rare use of assistive devices** can increase the risk for developing infrequent LBP in female healthcare workers reporting to be free from LBP at baseline"*

- Holtermann et al., 2015

Andersen et al., 2014; Stobbe et al., 1988; Retsas & Pinikahana, 2000; Eriksen et al., 2004; Holtermann et al., 2013; Holtermann et al., 2015; D`Arcy et al., 2012; Byrns et al., 2004.

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So why are we still hurtin´?

"For example, while it is commonly hypothesized that improving lifting technique, utilizing friction-reducing devices, focusing on manual handling training, or improving ergonomics at the workplace will result in positive outcomes related to MSDs, ***none of these interventions seem to confer any lasting benefit when reviewed systematically****."*

Vinstrup, 2019; Stobbe et al., 1988; Hegewald et al., 2018; Teeple et al., 2017; Hartvigsen et al., 2005; Clemes et al., 2010; Hoe et al., 2018; Dawson et al., 2007; **Freiberg et al., 2016; Thomas & Thomas, 2014; Richardson et al., 2018**

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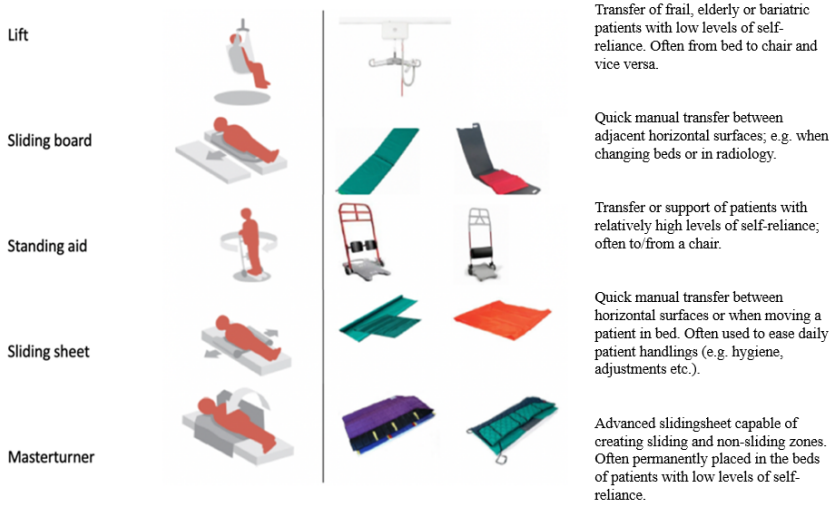
Technical field measurements of physical exposure



- **n=52**
- **14 assistive devices**
- **510 full patient transfers**
- **2000+ partial lifts**

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Physical exposure matrix

Table – Exposure profiles for different assistive devices

Assistive device	Index	EMG	Forward flexion	Lateral flexion
No assistive device	**1**	1	1	1
Hospital bed	**0,8600**	0,9211	0,5492	1,0486
Intelligent bed	**0,8246**	0,8566	0,6792	0,9060
Bed sheet	**1,0289**	1,0968	1,0065	0,9155
Walking aids	**1,0200**	0,9892	1,0440	1,0573
Masterturner	**0,8582**	0,9606	0,7903	0,7215
Sliding sheet	**1,0109**	1,0860	1,0455	0,8259
Ceiling-lift	**0,7762**	0,860	0,6123	0,7721
Sliding board	**1,0264**	1,2007	1,0788	0,6253
Standing aids	**0,8517**	0,9283	0,8372	0,7130

Fully-adjusted exposure profiles based on the weighted contribution of EMG, forward- and lateral flexion values during full-day field measurements.

Vinstrup et al. 2020; Hui et al., 2001; Vieira et al., 2006; Ryden et al., 1989; Sagherian et al., 2017; Bláfoss et al., 2019.

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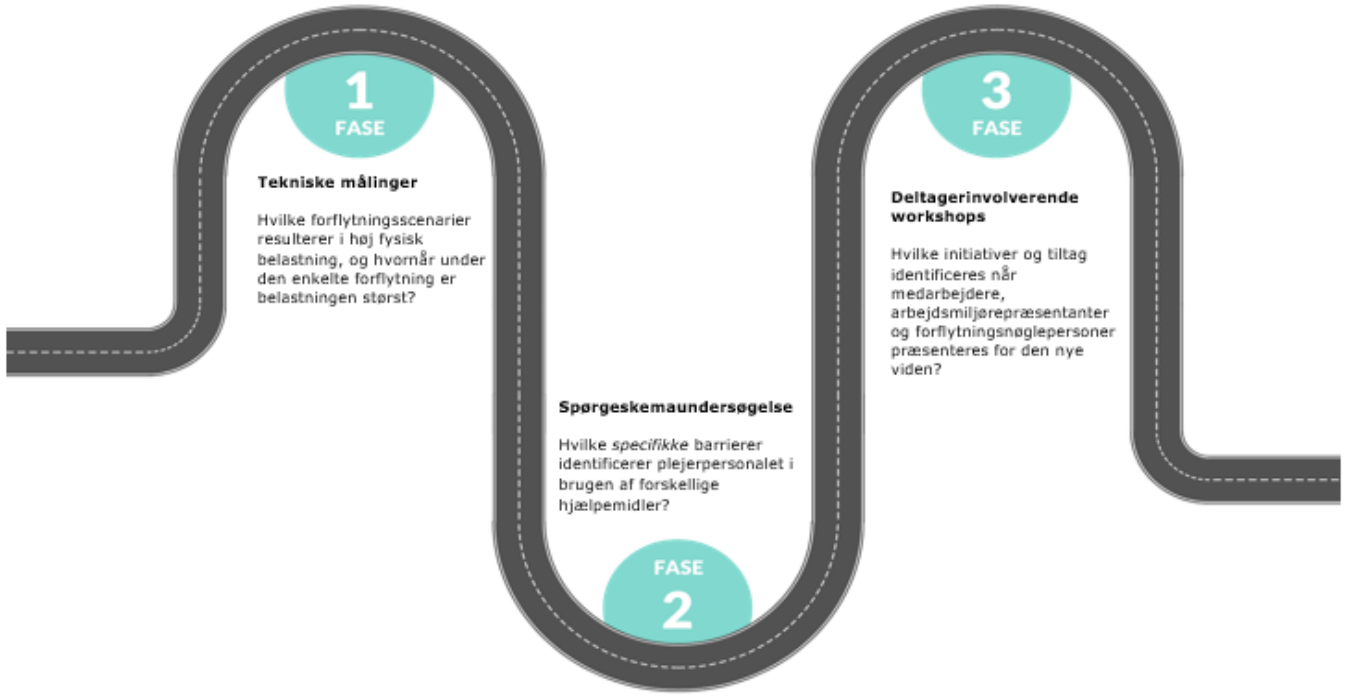
Technical measurements, surveys, and workshops



"Insufficient facts always invite danger."

- Spock

Figure - The 3 phases of the project including technical measurements, a questionnaire survey and participatory workshops

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Phase 1 - Physical load during patient transfer

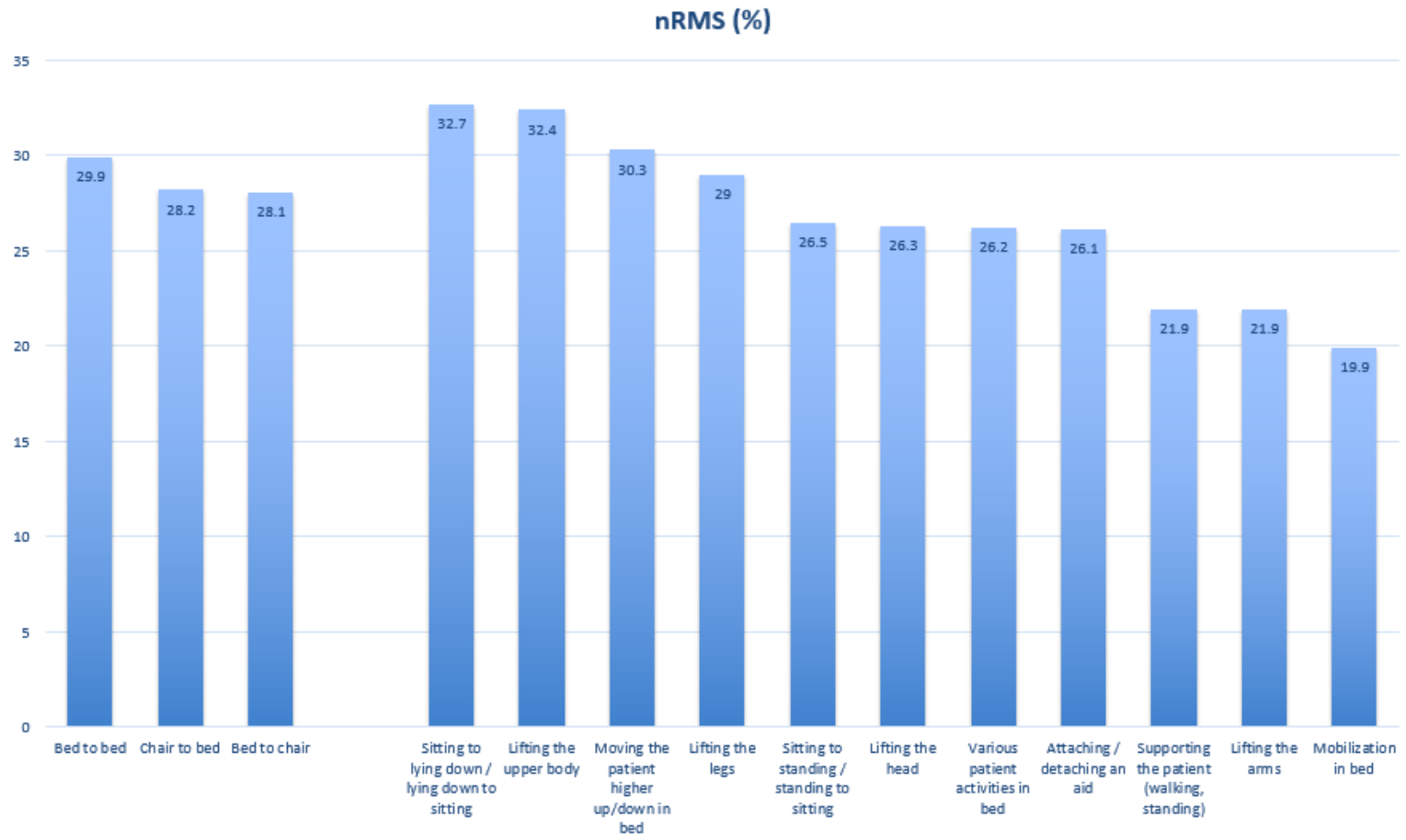

Figure - Fully-adjusted normalized EMG (nRMS) values for the erector spinae muscles during different types of patient transfer

Vinstrup et al., 2024

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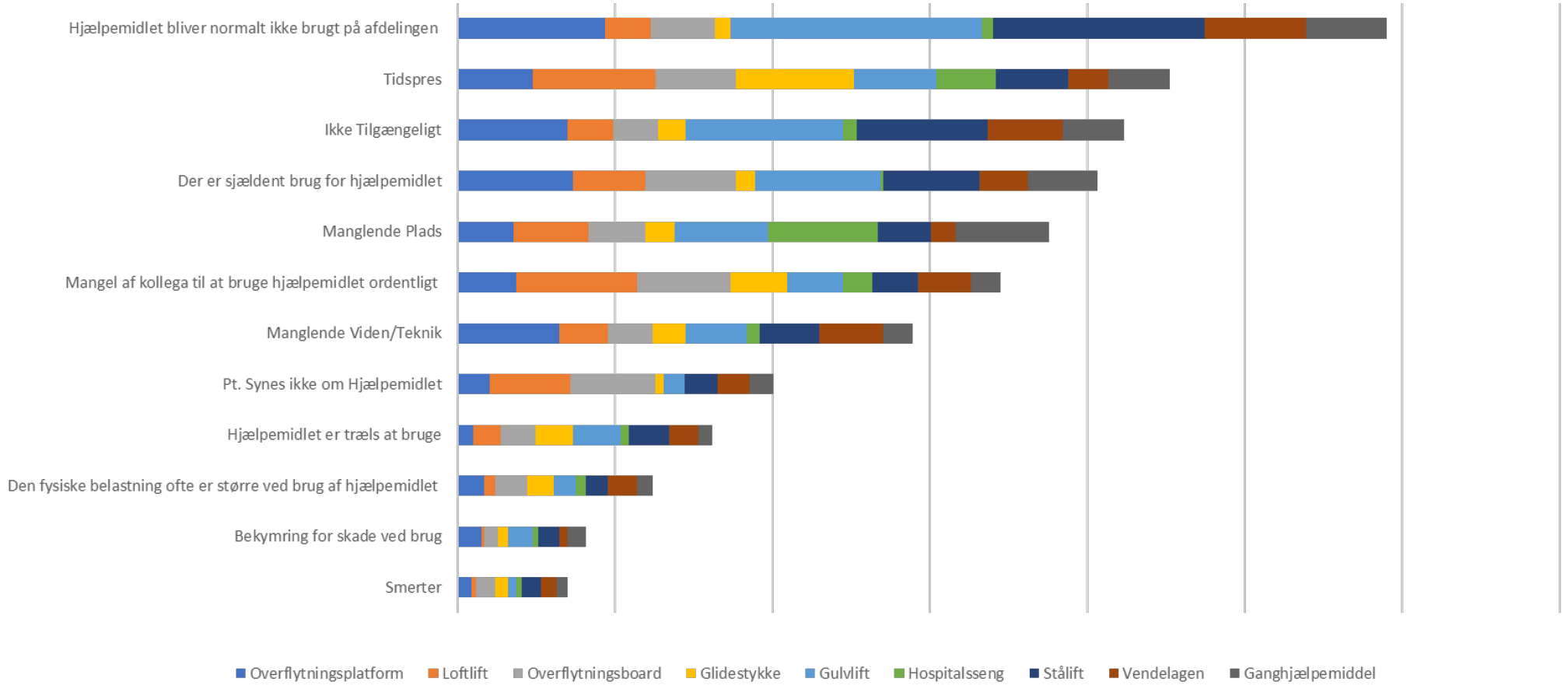
Phase 2 - Barriers for using assistive devices



Vinstrup et al.

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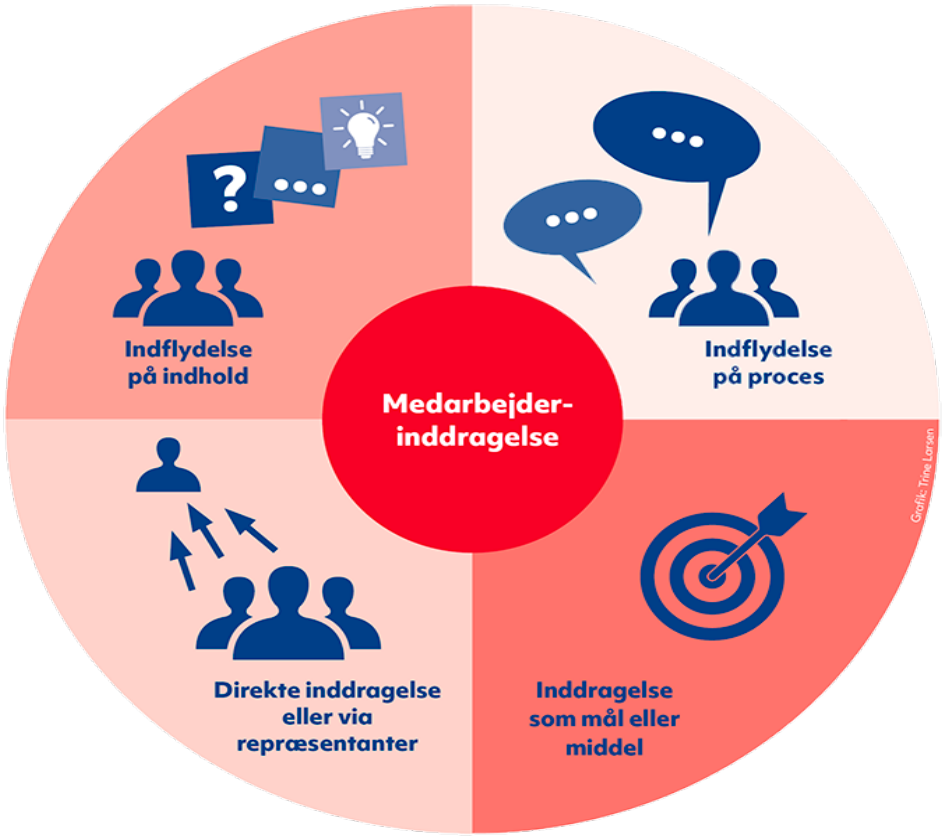
Phase 3 - Participatory workshops



Culture and habits

Work routines, established habits, and the culture surrounding patient transfer scenarios at the specific ward, were highlighted as significant barriers to improving lifting practices. The participants

Time constraints

Time pressure and staff shortages quickly create a work environment where there isn’t always time to perform patient transfers using the appropriate assistive devices, which can then lead to the worker finding it necessary to perform the lift quickly and without assistance.

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Towards a healthier practice

Fase 1: Fysisk belastning under patientforflytning

Patientforflytning er mere end bare flytning af patienter. For det første, er det ikke altid sikkert, at den pågældende patient og det tilgængelige hjælpemiddel er et godt match. For det andet, viser de nye resultater, at visse forflytningssituationer belaster kroppen væsentligt mere end andre.

Projektet havde til formål at kortlægge den fysiske belastning under en række forskellige patientforflytninger på danske hospitaler. Forskerne udførte tekniske målinger lokalt på afdelingerne, hvor patientforflytningerne alle blev udført som vanligt – dvs. både med og uden hjælpemidler. Hvor den tidligere forflytningsforskning primært er foregået i laboratoriet, bidrager disse resultater med tidssvarende målinger af den fysiske belastning i arbejdet, og identificerer hertil de gængse del-forflytninger i en praksisnær sammenhæng. Nedenfor illustreres en række af de disse, kategoriseret som enten lav (<25% af max), moderat (25-30% af max) eller høj belastning (>30% af max).

Resultater

Konklusion

Fase 1 identificerede en række patientforflytninger, som belaster kroppen nævneværdigt mere end andre. I sig selv er dette ikke nødvendigvis et problem, men hvis man har gentagne tunge løft i løbet af sin arbejdsdag, hver dag, kan den akkumulerede belastning på kroppen blive for høj. Disse resultater kan derfor bruges til at fordele de tungeste patientforflytninger blandt personalet, og som en huskeregel til, at der særligt til nogle forflytninger konsekvent bør anvendes hjælpemidler.

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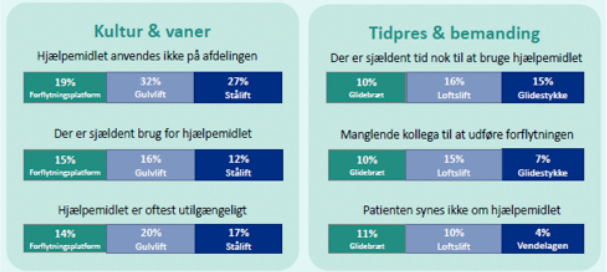
Fase 2: Barrierer for brugen af hjælpemidler

Det er velkendt, at det kan være tungt at flytte patienter. Mens nogle forflytningssituationer belaster kroppen mere end andre, er der ligeledes enighed om, at det sjældent er en dårlig idé at bruge hjælpemidler til forflytningen. Men hvorfor anvendes de så ikke konsekvent på afdelingen?

Projektet havde også til formål at identificere de *specifikke* barrierer, som plejepersonalet oplever i brugen af forskellige hjælpemidler. Mens tidligere forskning har undersøgt de mest gængse barrierer for den generelle brug af hjælpemidler, undersøgte dette projekt hvilke barrierer der oftest hænger sammen med brugen af hjælpemidlerne. Resultaterne viser, at der er stor forskel på hvilke barrierer der identificeres, afhængigt af det pågældende hjælpemiddel. Figuren nedenfor illustrerer de meste hyppige barrierer samt hvilke hjælpemidler de oftest associeres med.

Resultater



Konklusion

Fase 2 indikerer, at personalet oplever både kulturelle og organisatoriske barrierer. Kulturen på afdelingen spiller en særlig væsentlig rolle, da en betydelig del af personalet angiver, at hjælpemidler enten ikke anvendes på afdelingen, sjældent anses som nødvendige eller ofte er utilgængelige. For at øge brugen af hjælpemidler i praksis er det derfor vigtigt at adressere både de strukturelle og kulturelle udfordringer. Dette indebærer bl.a. øget tilgængelighed af udstyr, organisering af arbejdet samt en kulturændring, hvor hjælpemidler i højere grad bliver en naturlig del af arbejdet.

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Fase 3: Anbefalinger til god og sikker praksis

Fra forskning til praksis. Èn ting er, hvad projektets resultater viser. En ganske anden er, hvad plejepersonalet kan bruge dem til. I denne fase blev forflytningsnøglepersoner og arbejdsmiljørepræsentanter inviteret til en række workshops og netværksmøder, med henblik på at udarbejde praksis-relevante anbefalinger på baggrund af forskningen.

Projektets sidste fase kan derfor anses som den vigtigste, med det centrale spørgsmål: *"Hvordan bruger vi så denne nye viden i praksis?"*. En central indsigt fra denne fase var, at effektiv implementering kræver både strukturelle ændringer og kulturforandringer, hvor hjælpemidler bliver en naturlig del af arbejdsrutinerne. Nedenfor ses et repræsentativt udklip af de problematikker og løsningsforslag, som blev identificeret på fagfællemøderne blandt plejepersonalet.

Konklusion

Fase 3 omsatte resultaterne fra de forgående faser til konkrete praksisnære anbefalinger. De fagfælle-bedømte forslag pointerer vigtigheden af, at øge tilgængeligheden af hjælpemidler, forbedre arbejdets organisering, udnævnelse af forflytningsnøglepersoner, samt at styrke den kollegiale støtte gennem ressourcepersoner i alle vagtlag.

Projektet giver derfor et vigtigt indblik i hvilke arbejdsmiljøtiltag der efterspørges af plejepersonalet, med henblik på at øge sikkerheden omkring patientforflytningen. Resultaterne kan herudover anvendes i kortlægningen af den fysiske arbejdsbelastning samt i planlægningen og organiseringen af arbejdet, med hensynstagen til de lokale forhold på afdelingen.

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Physical exposure, and beyond!

Front Public Health. 2020 Aug 11;8:297. doi: 10.3389/fpubh.2020.00297. eCollection 2020.

Perceived Stress and Low-Back Pain Among Healthcare Workers: A Multi-Center Prospective Cohort Study

Jonas Vinstrup [1], Markus D Jakobsen [1], Lars L Andersen [1]

J Pain. 2023 Oct;24(10):1820-1829. doi: 10.1016/j.jpain.2023.05.009. Epub 2023 May 16.

Pain Control Beliefs Predict Premature Withdrawal From the Labor Market in Workers With Persistent Pain: Prospective Cohort Study With 11-Year Register Follow-up

Jonas Vinstrup [1], Rúni Bláfoss [2], Rubén López-Bueno [3], Joaquin Calatayud [4], Ebbe Villadsen [1], Thomas Clausen [1], Víctor Doménech-García [5], Lars Louis Andersen [6]

Int J Environ Res Public Health. 2020 Feb 5;17(3):996. doi: 10.3390/ijerph17030996.

Poor Sleep Is a Risk Factor for Low-Back Pain among Healthcare Workers: Prospective Cohort Study

Jonas Vinstrup [1], Markus D Jakobsen [1], Lars L Andersen [1]

Int J Environ Res Public Health. 2019 Nov 15;16(22):4528. doi: 10.3390/ijerph16224528.

Physical and Psychosocial Work Environmental Risk Factors for Back Injury among Healthcare Workers: Prospective Cohort Study

Lars Louis Andersen [1], Jonas Vinstrup [1], Ebbe Villadsen [1], Kenneth Jay [1], Markus Due Jakobsen [1]

Scand J Work Environ Health. 2021 Nov 1;47(8):609-618. doi: 10.5271/sjweh.3979. Epub 2021 Aug 16.

Are resident handlings in eldercare wards associated with musculoskeletal pain and sickness absence among the workers? A prospective study based on onsite observations

Leticia Bergamin Januario [1], Svend Erik Mathiassen, Matthew L Stevens, Andreas Holtermann, Gunnar Bergström, Reiner Rugulies, Kristina Karstad, David M Hallman

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Organization and structuring of work

*"Interventions for the prevention and management of work-related MSD in nurses should take a **multifaceted approach inclusive of physical and psychosocial components** embedded within a comprehensive patient handling programme."*

- Boocock et al., 2019.

"*Compared to workers in **balanced wards**, workers in **turbulent wards** had more days with neck/shoulder and low-back pain; and those working in **strained wards** had more days with LBP and higher pain intensities.*"

- Januario et al., 2021

Forflyt.dk; Boocock et al., 2019; Januario et al., 2021

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The End

"Quis Custodiet Ipsos Custodes?"

– Juvenal

Arbejdsmiljø-forskningsfonden

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