

SHORT REPORT

Respiratory and dermal symptoms in Thai nurses using latex products

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Background	Despite known health risks related to the use of powdered latex gloves (PLGs), they are still widely used in hospitals in developing countries due to the high cost of alternatives.
Aims	To determine the prevalence of dermal and respiratory symptoms associated with latex glove use in nurses in Thailand and evaluate the influence of previously reported occupational risk factors in this population.
Methods	A cross-sectional study in female nurses working in three Thai hospitals. Participants completed a questionnaire on demographics, occupational and personal history, use of latex products at work and dermal and respiratory symptoms attributed to occupational use of latex gloves.
Results	Of 899 nurses, 18% reported health effects attributed to the use of latex products. After adjustment for confounding, occupational risk factors associated with increased reporting of dermal symptoms included wearing more than 15 pairs of PLG per day (odds ratio (OR): 2.10, 95% confidence interval (CI): [1.32–3.34]), using chlorhexidine (OR: 2.07, 95% CI: [1.22–3.52]) and being an operating theatre nurse (OR: 2.46, 95% CI: [1.47–4.12]). Being a labour ward nurse (OR: 3.52, 95% CI: [1.26–9.85]) was the only factor associated with increased reporting of respiratory symptoms.
Conclusions	Continuing use of PLGs in Thai nurses is associated with increased prevalence of dermal symptoms compared with data from developed countries. Measures to reduce such health effects are well established and should be considered. Additionally, replacement of chlorhexidine with an alternative detergent seems advisable.
Key words	Aeroallergens, chlorhexidine, dermal symptoms, latex allergy, latex gloves, nursing, occupational factors, respiratory symptoms, Thailand.

Introduction

Exposure to latex allergens through contact with the skin or cutaneous membranes, as well as through inhalation, ingestion, injection or inoculation, can cause an immune response resulting in symptoms that range from relatively minor, including skin irritation, to severe reactions such as asthma and anaphylaxis [1].

Due to the nature of their work, health care workers (HCWs) are exposed to latex in powdered latex gloves (PLGs) [2], which have been identified as an important occupational risk factor for the development of latex allergy [1,3]. The increased use of disposable PLGs in HCWs triggered by the introduction of ‘universal precautions’ in 1987 resulted in a large increase in the incidence of latex allergy [3]. In recent years, powder-free

and low- or non-latex gloves (e.g. vinyl, nitrile and neoprene) have been introduced to replace PLGs and eliminate or minimize the risk of developing latex allergy. However, in developing countries, PLGs are still widely used in hospitals due to the high cost of the alternatives.

This study aimed to determine the prevalence of adverse health effects associated with the use of latex gloves in nurses in Thailand and to further determine important occupational risk factors.

Methods

We undertook a cross-sectional study in three hospitals in Thailand in the period between February and June 2009. All female nurses employed in these hospitals were invited to participate. Study information sheets,

Table 1. Demographics of participating nurses

Variable	<i>n</i> ^a (%)	Study area		
		Hospital 1 (<i>n</i> = 304)	Hospital 2 (<i>n</i> = 345)	Hospital 3 (<i>n</i> = 251)
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Age (years)				
<30	249 (28)	74 (25)	58 (17)	117 (48)
31–40	377 (43)	134 (45)	155 (45)	88 (36)
41–50	186 (21)	68 (23)	84 (24)	34 (14)
>50	76 (8)	21 (7)	48 (14)	7 (3)
Mean ± standard deviation	35.1 ± 8.8	35.5 ± 8.3	37.4 ± 9.1	31.3 ± 7.8
Ethnicity				
Thai	754 (82)	271 (89)	233 (65)	250 (99)
Thai-Chinese	28 (3)	9 (3)	16 (4)	3 (1)
Thai-Malaysian	134 (15)	23 (8)	111 (31)	0 (0)
Unknown ^b	1 (0.1)	1 (0.3)	0 (0)	0 (0)
Education				
Diploma	115 (13)	10 (3)	41 (11)	64 (25)
Bachelor	738 (81)	265 (87)	296 (82)	177 (70)
Master	63 (7)	28 (9)	23 (6)	12 (5)
Unknown ^b	1 (0.1)	1 (0.3)	0 (0)	0 (0)
Any personal illness ^c	315 (35)	110 (36)	113 (33)	92 (37)
Hay fever	76 (24)	30 (27)	24 (21)	22 (24)
Grass allergy	67 (21)	23 (21)	21 (19)	23 (25)
Eczema	133 (42)	42 (38)	49 (43)	42 (46)
Urticaria	201 (64)	65 (59)	80 (71)	56 (61)
Asthma	43 (14)	17 (16)	9 (8)	17 (19)
Autoimmune	22 (7)	3 (3)	9 (8)	10 (11)
Atopy	196 (62)	72 (66)	66 (58)	58 (63)
Antibiotic allergy ^c	64 (7)	27 (9)	24 (7)	13 (5)
Food allergy ^c	94 (11)	34 (11)	36 (11)	24 (10)
History of operations ^c	403 (45)	149 (49)	163 (47)	91 (36)
Working conditions				
Frequency of hand washing per day				
Mean ± standard deviation	18.5 ± 12.5	21.6 ± 13.2	16.6 ± 10.9	17.6 ± 13.1
Median (min–max)	15 (1–80)	20 (3–70)	14 (1–60)	14 (2–80)
Hand detergents				
Soap	377 (41)	82 (27)	200 (56)	95 (38)
Alcohol hand rub	642 (71)	223 (74)	264 (74)	155 (62)
Chlorhexidine	649 (71)	2 (83)	169 (47)	229 (92)
Povidone scrub	121 (13)	7 (2)	96 (27)	18 (7)
Frequency of PLG use				
Mean ± standard deviation	12.2 ± 11.6	13.0 ± 12.1	13.6 ± 13.3	9.4 ± 7.3
Median (min–max)	10 (1–83)	10 (1–70)	10 (1–83)	8 (1–50)
Duration of PLG use (h/day)				
Mean ± standard deviation	3.1 ± 2.5	3.0 ± 2.4	3.5 ± 2.6	2.8 ± 2.4
Median (min–max)	2.3 (0.02–8.0)	2.3 (1.0–8.0)	3.0 (0.1–8.0)	2.0 (0.02–8.0)

^aTotal number of participants = 900.^bUnknowns were excluded in the analysis.^cMissing data for personal illness (*n* = 3), antibiotic allergy (*n* = 3), food allergy (*n* = 7) and history of operations (*n* = 1).

consent forms and questionnaires were sent to the heads of the nursing groups in all hospitals, who distributed them to all nurses in each department and collected the forms again from those nurses that agreed to participate. Nurses completed a questionnaire based on the Royal College of Physicians national guideline [4], the National Institute for Occupational Safety and Health

latex allergy guidelines [5] and literature [1], which was first evaluated in a small pilot study among nurses in another hospital in Thailand. Nurses were asked about any adverse health symptoms they attributed to (i.e. caused or aggravated by) use of latex gloves at work and about risk factors suspected of being associated with the development of adverse symptoms. These associations

were analysed using multiple logistic regression. The study was approved by the Hospital Human Rights and Ethics Committees of all three participating hospitals and by the Senate Committee on the Ethics of Research on Human Beings of the University of Manchester.

Results

Of 1353 nurses, 68% completed the questionnaire. Their mean age was 35 years (range 21–60), and participants were predominantly Thai (Table 1). Thirty-five per cent of nurses reported pre-existing allergic symptoms, and 45% had had an operation prior to the study. On average, nurses washed their hands 19 times per day (range 1–80), and 71% regularly used chlorhexidine. Nurses used on average about 12 pairs of gloves per day (1–83 pairs) for a total of 3 h daily (1 min–8 h).

Symptoms related to latex glove use were reported by 18% of nurses (Table 2). Dermal symptoms, particularly itchy skin and skin rash, were most frequently reported, while sneezing and rhinitis were the most commonly reported respiratory symptoms. Asthma was reported by one nurse. Most dermal symptoms were reported by nurses working in the operating theatres, emergency units and labour units. Respiratory symptoms were reported about twice as frequently in the labour wards as in other wards. Multiple logistic regression results indicated that occupational factors associated with increased reporting

of dermal symptoms included using more than 15 pairs of PLGs a day (OR: 2.12, 95% CI: [1.33–3.41]), using chlorhexidine (OR: 2.09, 95% CI: [1.23–3.54]) and working in operating theatres (OR 2.50 [1.49–4.19]), while working in labour units (OR 3.52 [1.26–9.85]) was the only occupational risk factor significantly associated with increased reporting of respiratory symptoms.

Discussion

The prevalence of self-reported symptoms attributed to the use of PLGs was 18%. This is comparable to the combined 10% cutaneous and 5% non-cutaneous symptoms previously reported for Thai nurses [6] but somewhat lower than the 24% recently reported for Thai HCWs in general [7]. However, the observed prevalence is three times higher than that reported in the developed world [8]. Reported symptoms were primarily dermal (84%), but 27% also reported respiratory symptoms and 8% reported facial swelling or eye irritation, which is in agreement with the previous study on Thai nurses [7].

This study had a relatively high response rate. However, because of the cross-sectional design the relatively high prevalence may still be an underestimate because nurses experiencing symptoms may have changed jobs or wards prior to the study. Furthermore, the use of questionnaires is likely to have introduced some recall bias and misclassification bias. Attribution of symptoms to the use

Table 2. Self-reported latex glove-related symptoms in female nurses

Self-reported symptoms caused or aggravated by latex glove use	All (<i>n</i> = 899)	Study area		
		Hospital 1 (<i>n</i> = 304)	Hospital 2 (<i>n</i> = 345)	Hospital 3 (<i>n</i> = 250)
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Any, yes/no (% yes)	157/742 (18)	61/243 (20)	39/306 (11)	57/193 (23)
Dermal symptoms ^a				
Any (% of 157 SR cases)	132 (84)	49 (80)	29 (74)	54 (95)
Cracking skin	38 (29)	18 (37)	7 (24)	13 (24)
Eczema	19 (14)	8 (16)	1 (3)	10 (19)
Itchy and skin rash	113 (86)	38 (78)	25 (86)	50 (93)
Urticaria	7 (5)	3 (6)	3 (10)	1 (2)
Respiratory symptoms ^a				
Any (% of 157 SR cases)	43 (27)	20 (33)	12 (31)	11 (19)
Asthma	1 (2)	1 (5)	0 (0)	0 (0)
Rhinitis	18 (42)	11 (55)	1 (8)	6 (55)
Sneezing	29 (67)	9 (45)	12 (100)	8 (73)
Shortness of breath	4 (9)	2 (10)	0 (0)	2 (18)
Wheezing	1 (2)	1 (5)	0 (0)	0 (0)
Other symptoms ^a				
Any (% of 157 SR cases)	13 (8)	8 (13)	2 (5)	3 (5)
Eye irritation	12 (92)	8 (100)	1 (50)	3 (100)
Face and lip swelling	3 (23)	1 (13)	1 (50)	1 (33)

SR, self-reported.

^aParticipants could have reported more than one symptom.

of latex gloves was done by the nurses themselves, which may also have introduced bias, even though we expect nurses to be better than the general population at recognizing this association because of their training.

The highest prevalence of reported dermal symptoms occurred in emergency department, labour ward and operating theatre nurses, while respiratory symptoms were most often reported in the labour ward nurses. Interestingly, the highest frequency of PLG use was also in the labour units. To our knowledge, labour wards have not previously been specifically mentioned as having high rates of allergic symptoms related to PLG use although a high prevalence of symptoms among midwives has been previously reported [9].

Working in the operating theatre and heavy use of PLGs were associated with increased risk, whereas duration of glove use was not. Furthermore the use of chlorhexidine, which has previously been recognized to cause IgE-mediated allergic reactions in patients [10], increased the risk of dermal, but not respiratory symptoms, in this population.

The results of this study indicate that the prevalence of adverse health effects, primarily dermal, linked to the use of PLGs in nurses in Thailand remains relatively high. Consequently, a reduction in the use of latex gloves and/or replacement by non-latex alternatives should be considered, with a special focus on those working in labour units and operating theatres. Furthermore, replacement of chlorhexidine-containing detergents with alternatives may also reduce the incidence of new cases with dermal symptoms and is therefore recommended.

Key points

- This study shows that the prevalence of symptoms related to the use of latex products by nurses in Thailand remains higher than in the developed world.
- An increased risk of dermal symptoms was associated with wearing many pairs of gloves per day (but not duration of use), working in operating theatres and using chlorhexidine-containing detergents.
- Measures to reduce the health effects of latex glove use in hospitals in Thailand should be considered, as should a replacement detergent for chlorhexidine.

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Conflicts of interest

Dr Supapvanich works as a lecturer at Sirindhorn College of Public Health, Yala and this research was part of her PhD which was sponsored by the Thai Government.

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