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## Predictors of Healthcare Professionals' Attitudes Towards Family Involvement in Safety-Relevant Behaviours: A Cross-Sectional Factorial Survey Study

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# BMJ Open Predictors of healthcare professionals' attitudes towards family involvement in safety-relevant behaviours: a cross-sectional factorial survey study

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## ABSTRACT

**Objectives:** To investigate predictors of healthcare professionals' (HCPs) attitudes towards family involvement in safety-relevant behaviours.

**Design:** A cross-sectional fractional factorial survey that assessed HCPs' attitudes towards family involvement in two error scenarios relating to hand hygiene and medication safety. Each survey comprised two randomised vignettes that described the potential error, how the family member communicated with the HCP about the error and how the HCP responded to the family member's question.

**Setting:** 5 teaching hospitals in London, the Midlands and York. HCPs were approached on a range of medical and surgical wards.

**Participants:** 160 HCPs (73 doctors; 87 nurses) aged between 21 and 65 years (mean 37) 102 were female.

**Outcome measures:** HCP approval of family member's behaviour; HCP reaction to the family member; anticipated effects on the family member–HCP relationship; HCP support for being questioned about hand hygiene/medication; affective rating responses.

**Results:** HCPs supported family member's intervening (88%) but only 41% agreed this would have positive effects on the family member/HCP relationship. Across vignettes and error scenarios the strongest predictors of attitudes were how the HCP (in the scenario) responded to the family member and whether an error actually occurred. Doctors (vs nurses) provided systematically more positive affective ratings to the vignettes.

**Conclusions:** Important predictors of HCPs' attitudes towards family members' involvement in patient safety have been highlighted. In particular, a discouraging response from HCPs decreased support for family members being involved and had strong perceived negative effects on the family member/HCP relationship.

## INTRODUCTION

Improving patient safety is an international priority in healthcare.<sup>1–3</sup> Traditionally efforts

## Strengths and limitations of this study

- This is the first quantitative study to examine factors affecting doctors' and nurses' attitudes towards families questioning them about patient-related safety concerns.
- This paper highlights that the strongest predictors of attitudes were how the healthcare professional (HCP) (in the scenario) responded to the family member's questioning and whether an error actually occurred.
- We used experimental vignettes to assess important determinants of HCPs' attitudes but the ecological validity of the results remains to be established.
- Doctors and nurses were recruited from several sites across London, the Midlands and Yorkshire but the wider generalisability of the findings needs to be assessed.

to reduce preventable harm have targeted the practices and systems within healthcare organisations and the skills and behaviour of those delivering clinical care. More recently though, the contributions that patients can make to their safety have been highlighted,<sup>4–7</sup> with the last decade in particular seeing a surge of interest in this area.<sup>6, 8</sup> There are numerous opportunities throughout the care pathway for patients to help reduce their risk of healthcare harm.<sup>4, 9, 10</sup> Monitoring and questioning the safety practice of healthcare professionals (HCPs) is one area in particular that holds promise.<sup>11</sup> Patients have been shown to flag up safety problems (eg, being given the wrong medication) that may otherwise go unnoticed<sup>12</sup> meaning that prompt action can then be taken to mitigate (potential) adverse effects.

In addition to the patient themselves, the role of family members in monitoring safe practice can be equally important. In settings where patients are especially vulnerable and unable to look after themselves (eg,



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paediatrics and care of the elderly) families are often the patients' primary source of strength and support, thus their role in ensuring safety takes on a particularly important role. Despite the important contributions that family members could make, it is currently not clear what their attitudes towards involvement would be and/or their willingness to voice any safety-related concerns. However, drawing from the wider literature on patients themselves, evidence strongly suggests patients find it harder to ask questions that could be perceived as challenging the clinical abilities of HCPs (eg, 'Have you washed your hands?') than those related to more general aspects of their recovery ('How long will I be in hospital for?').<sup>6 11 13-17</sup> Fear of reprisal, being uncomfortable/anxious about asking, undermining HCPs' clinical abilities and adversely affecting the HCP-patient relationship are key reasons for patients' reluctance to participate.<sup>18-21</sup> To improve participatory levels research has shown that by HCPs giving patients encouragement to 'speak-up' about safety-related issues, a significant positive impact on their willingness to be involved can be observed.<sup>11 13 14 22</sup> It is likely (but yet to be empirically explored) that HCP encouragement could pose analogous effects on family members' willingness to ask safety-related questions. To date however, the extent to which HCPs would support such questioning from patient's families is unknown. Gaining this understanding could be critical to the successful engagement of families in promoting safety and could help to explain why HCPs may support such involvement in some situations but not others.

In previous research we conducted in Switzerland and the UK we used vignettes to explore HCPs' attitudes towards patient involvement in two different error scenarios: poor hand hygiene of the HCP and incorrect medication for the patient.<sup>23 24</sup> We found that several factors influenced HCPs' level of support for being questioned by patients. Most notably, HCPs viewed patient involvement more favourably if the error described in the scenario actually occurred (ie, the HCP had not cleaned their hands before treating the patient), if the patient posed the question in a polite versus challenging way and if the HCP responded in a helpful and reassuring manner (ie, the HCP apologised and cleaned their hands). In the present paper we aim to build on our previous research and to address the apparent gap in the evidence-base by examining HCPs' attitudes towards family involvement in safety. Our specific research question was: what are the predictors of doctors' and nurses' attitudes towards family members questioning HCPs: (1) about the HCPs' hand hygiene (HH), and (2) about the patient's medication?

## METHODS

### Design

A cross-sectional factorial survey containing vignettes was employed. The survey is an adaptation of a survey previously developed and applied by the authors.<sup>23-25</sup> In total

8 different surveys were used, each of which comprised vignettes on two types of potential errors; a possible medication error and potentially missed hand disinfection. Each vignette consisted of 7 dichotomous variables (factors) each with two levels that were chosen in accordance with previous research and a priori hypotheses.<sup>23-25</sup> Three factors in the vignettes related to the family member (relation to the patient (eg, parent, child), sex and the way in which they questioned the HCP in the scenario), two related to the HCP (occupation and reaction to the family member's question) and two were error-related (correct/false attribution of error and if the error was witnessed by another HCP). The seven variables generated 128 possible combinations. Using experimental design software this was reduced to 8 combinations of random pairings of the two clinical scenarios in a fractional main effects design<sup>26</sup> (see table 1 for examples of vignettes).

### Measures

A 22-item survey was developed to assess HCPs' attitudes towards family involvement in two different error scenarios, one relating to the hand hygiene of the HCP and the other relating to the patient's medication (11 items on each). Eight items (4 on each error scenario) assessed HCPs' level of agreement with 4 attitudinal statements about the scenario: (1) I approve of the family member's behaviour; (2) the HCP responded in the right manner; (3) the situation would have predominantly positive effects on the family member-HCP relationship and (4) I would as an HCP support the family member in asking me about my hand hygiene/the patient's medication. A 7-point Likert response scale was used ranging from 'strongly disagree' to 'strongly agree' (higher scores indicating more favourable responses).

Fourteen items (7 on each scenario) explored HCPs' 'affective' ratings of the family member intervening (ie, how they would feel if they were in the situation described in the scenario and were questioned by a patient's family member). HCPs were asked: "If you were the HCP, how would the described situation be for you?". Responses were presented as 7 semantic differentials: (1) bad—good; (2) difficult—easy; (3) confrontational—not confrontational at all; (4) uncomfortable—comfortable; (5) not helpful at all—very helpful; (6) very embarrassing—not embarrassing at all; (7) very challenging—not challenging at all. A 7-point response scale was used with the semantic differentials serving as anchor labels (higher scores indicating more favourable responses).

Prior to data collection the survey was tested on 20 HCPs (12 doctors and 8 nurses) and minor iterations were made to ensure face validity and comprehension of survey items.

### Participants

Data were collected from doctors and nurses from general medical and surgical wards at five hospitals in

**Table 1** Example vignettes

Factor	Levels with coding
A. Family member's sex	0: Female 1: Male
B. Relation to patient	0: Parent to patient 1: Child of patient
C. Situation witnessed	0: No, patient and HCP are alone 1: Yes, event is witnessed by other HCP
D. Staff occupation	0: Nurse 1: Doctor
E. Patient's behaviour	0: Inquiring 1: Challenging
F. Attribution of error	0: True, HCP did make an error 1: False, HCP did not make an error
G. Staff response	0: Encouraging 1: Discouraging

**Error scenario 1, vignette A<sub>0</sub>B<sub>0</sub>C<sub>1</sub>D<sub>1</sub>E<sub>0</sub>F<sub>0</sub>G<sub>1</sub>**

Mrs Smith is mother to a 5-year-old boy. Mrs Smith's son has been in hospital for a few days. He had a complicated appendectomy. Mrs Smith is present at hospital daily to watch after her son. During the morning several doctors and nurses enter the room. A doctor inspects the wound dressing of Mrs Smith's son. Mrs Smith looks anxious and asks: *excuse me, shouldn't you need to wash your hands?* As it is a very busy morning the doctor had in fact forgot to wash his hands. The doctor rolls his eyes and disinfects his hands using alcohol gel.

**Error scenario 2, vignette A<sub>1</sub>B<sub>0</sub>C<sub>0</sub>D<sub>1</sub>E<sub>1</sub>F<sub>0</sub>G<sub>0</sub>**

Mr Brown is father to a 5-year-old boy. Mr Brown's son has been in hospital for a number of days. He is suffering from severe heart problems. Mr Brown is present at hospital daily to watch after his son. His son has been prescribed several drugs. Early this morning, the nurse gave the medication to Mr Brown and instructed him that his son should take them with breakfast. Later on in the morning a doctor enters the room. The doctor asks Mr Brown's son how he is doing. Mr Brown looks angry and states: *Can you please check these red tablets. I do not think these are meant to be for my son!* The doctor had been very busy when writing prescriptions yesterday and had been interrupted several times. The doctor checks the medication against the chart and says: *oh yes it is very good that you ask. I am really sorry it seems that your son indeed has been given the wrong medication. Your prescription should not have changed.*

Letters in table 6 indicate factors and numbers in subscripts represent the levels.

London (N=3), Leicester (N=1) and York (N=1) between October 2013 and March 2014. HCPs were purposively sampled and approached face-to-face in the hospital wards, provided with an explanation of the study and asked for their consent to participate.

**Data analysis**

Data were analysed using STATA V.13. Mean scores for survey items were compared according to the error scenario and vignettes attributes. Significant differences were analysed using t tests. Scale reliability was computed (Cronbachs  $\alpha$ ) for the affective rating items for each error scenario (N=7) and the mean scale score was calculated. Multiple regression analyses were performed to examine the effect of vignette attributes and participants' characteristics (entered as predictor variables) on attitudes towards family member's involvement. Sample size was calculated based on recommendations for the use of regression analysis in behavioural research.<sup>27 28</sup>

Five regression models were conducted for each error scenario (10 in total) relating to each of our key outcome measures: (1) approval of family member's behaviour; (2) approval of HCP's response to the family member; (3) support for being asked as an HCP; (4) positive effects on the family member-HCP relationship,

and (5) the overall mean affective rating score. Chow tests were performed to test if the coefficients in the regression models for the medication error and hand hygiene scenarios were significantly different or whether the models could be pooled. Data were screened and to ensure parametric assumptions were met. All tests were two-sided. We considered  $p < 0.05$  to be significant.

**RESULTS****Participant characteristics**

In total, 209 HCPs were approached and 160 HCP completed the survey (77% response rate). Seventy-three (46%) were doctors, and 87 (54%) were nurses, aged between 21 and 65 years (mean=37 years; SD=10.4). One hundred and two (64%) responders were women. Participants had on average 11 years of professional experience (SD=10 years). HCPs who declined participation did so because they said they were too busy (N=40) or did not want to take part in the study (N=9).

**Findings in relation to error frame**

Across all scenarios, HCPs were supportive of the family member intervening (ie, questioning the HCP; mean approval score=5.8, CI 5.6 to 5.9). However, only 41%

**Table 2** Results in relation to error frame (N=160)

Outcome measure (survey questions)	Error scenario*		
	Hand hygiene Mean, (CI)	Medication error Mean, (CI)	p Value
I approve of the family member's behaviour	5.9 (5.6 to 6.1)	5.7 (5.4 to 5.9)	0.2589
The HCP responded in the right manner	4.8 (4.5 to 5.2)	4.7 (4.3 to 5.0)	0.5015
The situation would have predominantly positive effects on the caregiver–HCP relationship	4.0 (3.7 to 4.4)	3.8 (3.5 to 4.2)	0.3852
I would as a HCP support the caregiver asking me	6.0 (5.8 to 6.2)	6.0 (5.8 to 6.2)	0.9650

\*Level of agreement was measured on a 7-point Likert response scale with higher numbers indicating higher levels of agreement. HCP, healthcare professional.

agreed that such behaviour would have positive effects on the family member–HCP relationship (responders with ratings >4). There were no significant differences in HCPs' responses to family members intervening in the medication error frame compared to the hand hygiene frame (table 2).

### Affecting ratings scores

There was high internal consistency between HCPs' affective ratings scores (Cronbachs  $\alpha=0.90$ ). Thus composite scores were calculated (ie, overall mean score of the seven affective ratings per person). There were no significant differences in the affective ratings or in the composite score in the medication error frame versus the hand hygiene frame. Doctors provided systematically more positive affective ratings as compared to nurses (table 3).

### Correlations between affective rating scores and key outcome measures

HCPs' mean affective rating scores (composite measure) and responses to the 4 attitudinal judgments were only weakly correlated: I approve of the family member's behaviour ( $r=0.08$ ,  $p=0.18$ ); support for being asked as an HCP ( $r=0.10$ ,  $p=0.07$ ); the HCP responded in the correct manner ( $r=0.12$ ,  $p=0.03$ ); the situation would

have positive effects on the family member–HCP relationship ( $r=0.26$ ,  $p<0.001$ ). Thus, overall, HCPs were more likely to expect positive effects on the family member–HCP relationship if they also perceived the HCP behaviour more favourably.

### Results of the regression analyses

In multiple regression analyses, the impact of vignette attributes and respondents' characteristics on each of the survey questions were modelled. The results of the Chow tests revealed that the coefficients of the medication error and the hand hygiene models were not equal for three of five outcomes measures (approval of behaviour; support of being asked as an HCP; affective rating composite score). Based on these findings we estimated separate models for the different error frames. The results of the regression analyses are displayed in tables 4–6.

The single most important predictor variable in all models was the described HCP response to the family member intervening (variable nr 7 in the tables). A discouraging HCP response (as compared with an encouraging response) was associated with decreased approval and support of the family member's behaviour and affective ratings and had strong negative impact on the anticipated HCP–family member relationship. In both error frames, HCP reactions to the family member's behaviour were strongly associated with respondents'

**Table 3** Results of affective ratings scores (N=160)

Affective items	Mean rating* (CI)			p Value
	Total	Doctors	Nurses	
Bad–Good	3.6 (3.4 to 3.8)	4.0 (3.7 to 4.2)	3.4 (3.1 to 3.7)	0.0041
Difficult–Easy	3.7 (3.5 to 3.9)	4.1 (3.8 to 4.3)	3.3 (3.1 to 3.6)	0.0001
Confrontational–Not confrontational	3.9 (3.7 to 4.1)	4.2 (3.9 to 4.5)	3.7 (3.4 to 4.0)	0.0243
Not helpful–Very helpful	4.7 (4.6 to 4.9)	4.8 (4.6 to 5.0)	4.7 (4.4 to 4.9)	0.4661
Very embarrassing–Not embarrassing	3.8 (3.5 to 4.0)	4.3 (4.0 to 4.6)	3.3 (3.0 to 3.6)	<0.0001
Challenging–Not challenging	4.1 (3.9 to 4.3)	4.4 (4.1 to 4.7)	3.8 (3.5 to 4.1)	0.0040
Very uncomfortable–Comfortable	3.6 (3.4 to 3.8)	4.1 (3.8 to 4.3)	3.2 (2.9 to 3.5)	<0.0001
Composite, affective score†	3.9 (3.8 to 4.1)	4.2 (4.0 to 4.5)	3.6 (3.4 to 3.8)	0.0001

\*A 7-point response scale was used with the semantic differentials serving as anchor labels (higher scores indicating more favourable responses).

†Mean over the seven ratings per person.

Table 4 Results of multiple regression analyses (N=160)

Variable nr	Vignette attributes	Approval of family member's behaviour						The HCP responded in the right manner					
		HH error vignettes			Medication error vignettes			HH error vignettes			Medication error vignettes		
		Coefficient	95% CI	P Value	Coefficient	95% CI	P Value	Coefficient	95% CI	P Value	Coefficient	95% CI	P Value
1	Family member gender (1=male)	0.047	-0.383 to 0.477	0.830	-0.422 to 0.337	0.825	-0.779	-1.321 to 0.236	0.005	-0.403	-0.881 to 0.075	0.098	
2	Relation to patient (1=daughter/son of patient)	-0.251	-0.679 to 0.177	0.249	-0.813 to -0.058	0.024	0.232	-0.308 to 0.772	0.398	0.015	-0.462 to 0.491	0.952	
3	Situation witnessed (1=yes)	0.056	-0.385 to 0.496	0.803	-0.692 to 0.053	0.092	-0.072	-0.627 to 0.483	0.799	0.299	-0.171 to 0.769	0.210	
4	Staff occupation (1=doc)	0.110	-0.316 to 0.535	0.611	0.037 to 0.820	0.032	0.226	-0.310 to 0.763	0.406	0.621	0.126 to 1.115	0.014	
5	Family member behaviour (1=challenging)	-0.384	-0.808 to 0.040	0.076	-1.737 to -0.987	0.000	0.386	-0.149 to 0.920	0.156	-0.210	-0.683 to 0.263	0.382	
6	Attribution of error (1=false)	-1.033	-1.471 to -0.594	0.000	-1.059 to -0.306	0.000	-0.779	-1.331 to -0.226	0.006	-0.422	-0.897 to 0.053	0.081	
7	Staff response (1=discouraging)	-0.583	-1.013 to -0.153	0.008	-1.143 to -0.370	0.000	-2.799	-3.341 to -2.257	0.000	-3.119	-3.606 to -2.632	0.000	
8	Respondents' characteristics												
9	Doctor or nurse (1=nurse)	0.520	0.040 to 1.000	0.034	-0.340 to 0.506	0.699	0.498	-0.107 to 1.103	0.106	0.355	-0.179 to 0.889	0.191	
10	Age, years	0.008	-0.038 to 0.054	0.726	-0.075 to 0.006	0.097	-0.024	-0.082 to 0.034	0.410	0.010	-0.041 to 0.062	0.686	
11	Sex (1=female)	0.019	-0.488 to 0.525	0.942	-0.539 to 0.355	0.686	-0.731	-1.370 to -0.092	0.025	-0.343	-0.907 to 0.220	0.231	
12	Years of experience, years	-0.016	-0.065 to 0.034	0.534	0.005 to 0.092	0.030	0.011	-0.052 to 0.073	0.739	-0.033	-0.088 to 0.022	0.237	
	constant	6.449	4.875 to 8.022	0.000	6.741 to 9.278	0.000	7.596	5.612 to 9.580	0.000	6.261	4.661 to 7.861	0.000	
	R-sqr	0.229					0.467			0.581			
	overall model p	<0.001					<0.001			<0.001			

HCP, healthcare professional; HH, hand hygiene.

evaluations of whether the HCP responded in the right manner—a discouraging reaction was clearly judged negatively by participants.

The hypothetical family member's sex (variable nr 1) played a role in the evaluation of the interactions with staff (HCP response to being questioned and effects on the HCP–family member relationship) with male family members' interventions viewed less positively by responders. Family member's sex contributed considerably to HCP's affective ratings but with opposite directions in the medication and hand hygiene frames. Irrespective of vignette attributes, affective ratings were more positive when the family member intervening was a male in the hand hygiene frame while they were higher for female family members in the medication error scenario.

Whether the family member intervening was a daughter/son of a senior patient or mother/father of a hospitalised child (variable nr 2) was only marginally and sporadically associated with the outcome measures.

When family members were described as intervening in a challenging rather than an inquiring way (variable nr 5) this only had negative effects on approval and support of the behaviour in the medication error frames. In particular, it did not influence the affective ratings.

The profession of the HCP involved in the interaction with the family member (variable nr 4) impacted on the evaluations of the medication errors frames: The behaviour was more likely to be approved and seen as positively affecting the relationship in scenarios in which the family member intervened towards a doctor rather than a nurse.

The attribution of error (variable nr 6) was an important predictor in the hand hygiene models in particular. A false attribution of missed hand hygiene decreased approval and support of the behaviour and also had negative associations with the anticipated HCP–family member relationship. Notably, a false attribution of error had positive effects on the affective ratings in the medication error frame.

Whether the situation was witnessed by another HCP (variable nr 3) was only significantly associated with the affective ratings of the medication error frame but not with any of the other outcomes. The family member's behaviour was perceived less positive when the situation was witnessed by coworkers.

In comparison to vignette attributes, personal characteristics of respondents (variables 8–11) had only minor effects on their judgments: nurses as compared to doctors (variable nr 8) were significantly more likely to approve of the family member's behaviour (in the hand hygiene scenarios) and support the family member (both error frames). However, even after adjusting for vignette characteristics, doctors were more likely to provide higher affective ratings as compared to nurses. Other respondent's characteristics had only unsystematic and marginal effects on vignette ratings.



Table 5 Results of multiple regression analyses (N=160)

Variable nr	Vignette attributes	Positive effects on the family member/HCP relationship						Support for being asked as a HCP					
		HH error vignettes			Medication error vignettes			HH error vignettes			Medication error vignettes		
		Coefficient	95% CI	p Value	Coefficient	95% CI	p Value	Coefficient	95% CI	p Value	Coefficient	95% CI	p Value
1	Family member gender (1=male)	-0.523	-1.072 to 0.026	0.062	-0.596	-1.073 to -0.120	0.015	-0.308	-0.676 to 0.060	0.101	-0.120	-0.508 to 0.267	0.540
2	Relation to patient (1=daughter/son of patient)	0.321	-0.226 to 0.867	0.248	0.038	-0.437 to 0.512	0.875	0.389	0.023 to 0.756	0.038	-0.195	-0.581 to 0.191	0.320
3	Situation witnessed (1=yes)	0.045	-0.517 to 0.607	0.874	0.132	-0.336 to 0.600	0.577	0.293	-0.084 to 0.669	0.127	-0.186	-0.566 to 0.195	0.336
4	Staff occupation (1=doc)	0.050	-0.493 to 0.593	0.856	0.760	0.267 to 1.252	0.003	0.395	0.031 to 0.759	0.034	0.072	-0.329 to 0.472	0.724
5	Family member behaviour (1=challenging)	-0.127	-0.668 to 0.413	0.642	-0.454	-0.926 to 0.017	0.059	0.225	-0.138 to 0.587	0.223	-0.432	-0.815 to -0.048	0.028
6	Attribution of error (1=false)	-0.943	-1.502 to -0.384	0.001	0.098	-0.375 to 0.571	0.683	-0.725	-1.100 to -0.350	0.000	0.162	-0.223 to 0.547	0.408
7	Staff response (1=discouraging)	-2.245	-2.794 to -1.697	0.000	-2.420	-2.905 to -1.934	0.000	-0.509	-0.877 to -0.141	0.007	-0.379	-0.774 to 0.016	0.060
8	Respondents' characteristics												
9	Doctor or nurse (1=nurse)	0.400	-0.212 to 1.012	0.199	0.172	-0.360 to 0.703	0.524	0.490	0.079 to 0.900	0.020	0.580	0.148 to 1.013	0.009
10	Age, years	-0.004	-0.063 to 0.055	0.897	-0.003	-0.054 to 0.048	0.915	-0.007	-0.047 to 0.032	0.711	0.005	-0.037 to 0.046	0.821
11	Sex (1=female)	-0.377	-1.024 to 0.269	0.251	-0.135	-0.696 to 0.427	0.636	-0.139	-0.573 to 0.294	0.527	-0.153	-0.610 to 0.303	0.508
12	Years of experience, years	-0.011	-0.074 to 0.052	0.733	-0.019	-0.074 to 0.035	0.488	-0.005	-0.048 to 0.037	0.802	0.003	-0.041 to 0.048	0.893
	constant	6.043	4.035 to 8.051	0.000	5.374	3.780 to 6.968	0.000	6.297	4.950 to 7.644	0.000	6.135	4.839 to 7.431	0.000
	R-sqr	0.377			0.484			0.255			0.124		
	overall model p	>0.001			<0.001			<0.001			0.042		

HCP, healthcare professional; HH, hand hygiene.

## DISCUSSION

This experimental vignette study set out to explore factors that influence HCPs' attitudes towards family member's involvement in two safety-relevant areas: asking HCPs about their hand hygiene and checking patients' medication. To our knowledge, this is the first study into the acceptance of family member's involvement in this area. Overall, we found a high level of support and approval for families intervening among surveyed HCPs in both error scenarios. However, over all described situations 60% disagreed that the family member's behaviour would have positive effects on the relationship with the HCP. Across vignette attribute specifications, no differences between respondents' attitudes towards the hand hygiene and the medication error frames were observed. Two factors in particular appeared to have a strong effect on attitudes—correct attribution of the error and how the HCP reacted to the family member's involvement. Doctors (vs nurses) provided systematically more positive affective ratings to the vignettes. In particular, they rated the hypothetical situations as easier and more comfortable to manage and as less embarrassing.

We found some important differences from our previous studies on HCPs' acceptance of patient involvement in safety.<sup>23 24</sup> First, respondents' evaluations of the vignettes were only slightly and unsystematically affected by how the family member intervened (challenging vs inquiring). Conversely however, our previous research revealed that patient behaviour was a strong predictor of HCPs' approval, a finding also reflected in the wider literature. Garcia-Williams reported that HCPs' level of support in patients asking them about their hand hygiene would 'depend' on how they were asked.<sup>15</sup> Second, HCPs in previous studies were much more positive about patient engagement in medication safety and were more reluctant about involvement in hand hygiene. In this study, we found some differences in attributes affecting outcomes measures (eg, approval and affective ratings), but only minor differences in overall level of support between medication error and hand hygiene frames. Taken together, these results could potentially suggest that HCPs actually view family involvement differently as it involves a different dynamic to the patient interacting with them. Family (versus patient) engagement in safety seems to trigger less emotionally and strong responses by HCPs. The fact that the affective ratings were not as strong as in our previous studies also lends some support to this hypothesis.

Another apparent difference between this study and prior research into HCP attitudes is that doctors in our study provided more favourable affective ratings than nurses. In previous research, including those using similar vignettes, nurses were not only more willing to support being questioned themselves about safety-related issues by patients,<sup>23 24 29</sup> they also reported more positive affective ratings.<sup>23 24</sup> We can only speculate on the reasons for this finding. One explanation

**Table 6** Results of multiple regression analyses (N=160)

Variable nr	Vignette attributes	Affective ratings scores					
		Hand hygiene vignettes			Medication error vignettes		
		Coefficient	95% CI	p Value	Coefficient	95% CI	p Value
1	Family member gender (1=male)	0.786	0.414 to 1.159	0.000	-0.846	-1.198 to -0.493	0.000
2	Relation to patient (1=daughter/son of patient)	0.015	-0.356 to 0.386	0.935	0.415	0.064 to 0.767	0.021
3	Situation witnessed (1=yes)	0.179	-0.203 to 0.560	0.356	-0.369	-0.715 to -0.022	0.037
4	Staff occupation (1=doc)	-0.048	-0.417 to 0.321	0.797	0.170	-0.195 to 0.534	0.359
5	Family member behaviour (1=challenging)	0.108	-0.260 to 0.475	0.564	-0.158	-0.506 to 0.191	0.374
6	Attribution of error (1=false)	-0.336	-0.716 to 0.044	0.083	1.288	0.938 to 1.638	0.000
7	Staff response (1=discouraging)	-1.062	-1.435 to -0.690	0.000	-0.592	-0.952 to -0.233	0.001
Respondents' characteristics							
8	Doctor or nurse (1=nurse)	-0.525	-0.941 to -0.109	0.014	-0.359	-0.753 to 0.034	0.073
9	Age, years	0.025	-0.015 to 0.065	0.226	0.017	-0.021 to 0.055	0.378
10	Sex (1=female)	-0.113	-0.552 to 0.327	0.613	-0.327	-0.743 to 0.089	0.122
11	Years of experience, years	-0.019	-0.062 to 0.024	0.375	-0.012	-0.052 to 0.029	0.572
12	constant	3.772	2.408 to 5.136	0.000	3.824	2.644 to 5.005	0.000
	R-sqr	0.320			0.439		
	overall model p	<0.001			<0.001		

may be that doctors less often experience situations in which family members question or challenge them. As a consequence, they may underestimate the difficulty of the situation and emotionally demanding interaction.

This study is the first of its kind to provide insight into HCPs' acceptance of family members questioning them about hand hygiene and medication safety-related concerns. A main strength is that we used an experimental design to systematically manipulate factors and observe the effects of this manipulation, something we would not be able to control for in observational studies. Still, direct observation studies of family-HCP interactions relating to patient safety are warranted. This would deepen our understanding of how, where and by whom such interactions are initiated and how satisfactory they are for HCP and family members. A second strength is that we can directly explore areas of agreement and differences between HCPs' attitudes towards patients' and family members' involvement in patient safety as we used the same factors and frames as in our previous studies. Finally, the response rate to the survey is reasonably good, in particular for an HCP sample.

The main limitation of our study is that we assessed attitudes and this is not always reflective of behaviour. We thus do not know how participants in our study would in reality respond to families engaging in the safety of their loved ones. We used 'true life' vignettes to improve and assimilate respondents' conceptions of family behaviour but the responses are still biased by 'hypotheticality'. The sample is relatively small and the wider generalisability of our results needs to be assessed in future studies. We also do not know whether any patient involvement activities in the hospitals may have affected the results. Owing to design and sample-size

reasons, we could not model interactions of vignette attributes although these may be important for judgments about the scenarios. Finally, it is worth noting that this was a cross-sectional study, therefore we cannot make causal inferences about the relationships between variables.

This study serves only as an initial step into research in family engagement in safety. Today, very little is known about family members' attitudes and feelings about engagement, let alone strategies to encourage involvement and whether families would be more willing to act on their loved ones' behalf than if they themselves were a patient in hospital. Future research is needed to enlighten the reasons and motivations underlying the attitudes as expressed by HCPs in our study. The vignettes could serve as a starting point in qualitative interview studies or focus groups with HCPs. Studies could use a similar design to explore family members' attitudes towards involvement—this would be an interesting parallel and is yet to be explored. It would be valuable to examine patients' perspectives on their families intervening. There may be occasions where patients do not want their family members to question staff. We also suggest studying the safety-related interactions between HCPs and family members in other medical settings, or even in comparison between settings, to gain a deeper understanding of the relevance of context. For example, family members of intensive care patients and the roles attributed to them may be viewed differently to other care settings due to patients often being unable to act for themselves in this context. HCPs in intensive care are also more used to being questioned and challenged by family members and may therefore experience less emotional distress when confronted by family members



about safety-related issues. Also, little is known about the benefits and adverse effects of family involvement. While family members questioning HCPs could result in positive effects (ie, improved safety), the potential adverse consequences of involving them remain unknown, for example, it could potentially heighten anxiety, placing inappropriate responsibility on them when they are already worried about their loved one, or it could make them fear if they do not question HCPs the patient will be at increased risk. It may also create tensions in their relationship with HCPs—although our results do not seem to indicate this.

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