Psychological processes underlying nurses' handwashing behaviour

Hanna, D., Davies, M., & Dempster, M. (2009). Psychological processes underlying nurses' handwashing behaviour. DOI: 10.1177/1757177409104596

Published in:
Journal of Infection Preventions

Document Version:
Publisher's PDF, also known as Version of record

Journal of Infection Prevention

http://bji.sagepub.com

Psychological processes underlying nurses' handwashing behaviour

Declan Hanna, Mark Davies and Martin Dempster

Journal of Infection Prevention 2009; 10; 90
DOI: 10.1177/1757177409104596

The online version of this article can be found at:
http://bji.sagepub.com/cgi/content/abstract/10/3/90

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
BJIC
Infection Prevention Society

Psychological processes underlying nurses' handwashing behaviour

Declan Hanna[1]*, Mark Davies[2], Martin Dempster[3]

1. Clinical Psychologist, Belfast Health & Social Care Trust, Department of Clinical Psychology, Belfast City Hospital, 95 Lisburn Road, Belfast BT9 7AB. Email: declan.hanna@belfasttrust.hscni.net

2. Consultant Clinical Psychologist, Belfast Health & Social Care Trust

3. Lecturer in Health Psychology, School of Psychology, Queen's University Belfast

** Corresponding author*

Accepted for publication: 26 February 2009

Key words: Health psychology, infection control, behaviour change, handwashing

Abstract

Aim/Background: Psychological models of behaviour change have been found to be useful in predicting health-related behaviour in patients but have rarely been used in relation to the health behaviour of staff. This study explored the association between a range of psychological variables and self-reported handwashing in a sample of nurses who work in a large general hospital.

Method: A questionnaire-based cross-sectional, correlational study was used. Questionnaires examining demographics, self-efficacy, perceived importance of handwashing, perception of risk, occupational stress and training related to handwashing were administered to an opportunity sample ($n = 76$) of nurses drawn from an acute hospital. ANOVAs, correlation and regression analyses were performed to determine significant covariates of handwashing behaviour.

Findings: There was a weak relationship between demographic variables and self-reported handwashing. The degree to which employees perceived their workplace to assist handwashing and the perceived importance of handwashing were related to self-reported handwashing. Accordingly further covariates of these variables were sought. Training received and occupational stress both covaried with nurses' perceptions of the degree to which their workplace assisted handwashing. Nurses' beliefs regarding the transmission of infections covaried with perceived importance of handwashing.

Conclusion: Occupational stress was observed to reduce the perception of having a supportive employer: organisations need to facilitate handwashing and protect staff from factors that have a detrimental impact, such as work-related stress. Nurses' perceived importance of the potential for poor handwashing practice to contribute to the transmission of infections should be highlighted in interventions.

Introduction

Background

Despite the consensus view that good hand hygiene is an integral aspect of infection control, rates of handwashing among healthcare professionals remain low (Larson & Kretzer, 1995; Pittet et al, 1999). Studies have reported observed rates of handwashing ranging from 60% within intensive care settings (Nobile et al, 2002) to 8.5% of a sample of trainee doctors (Feather et al, 2000).

Interventions developed to improve handwashing including educational interventions (Pittet et al, 2000), feedback on handwashing performance (Larson et al, 1997), the provision of accessible decontaminant materials, such as alcohol gels (Pittet et al, 2000; Teare et al, 2001) and automated sinks (Larson et al, 1997). Such approaches try to improve rates of handwashing by communicating the risks of not doing so and making equipment alterations or environmental modifications. Unfortunately research suggests that short-term improvements in hand hygiene practice are frequently not sustained (Larson et al, 1997; Naikoba & Hayward, 2001).

In contrast to those strategies aimed at changing professional behaviour, interventions aimed at influencing patient behaviours and adherence to medical recommendations are well developed and evidence based. It is recognised that a number of additional psychological constructs – in addition to risk perception and environmental changes – are necessary to fully understand how patients can be encouraged to change their behaviour in response to medical needs. These include self-efficacy, risk appraisal, perceived susceptibility, support and psychological distress. A number of theories such as the Health Belief Model (HBM; Rosenstock, 1974), Theory of Planned Behaviour (Ajzen, 1985, 1991) and stage models such as the Trans-theoretical Model (TTM; Prochaska & DiClemente, 1983) combine these constructs in various ways in an effort to predict 'health behaviours'.

One such theory is Social Cognitive Theory, which includes as its central tenet the influence of self-efficacy. Self-efficacy (Bandura, 1977) has been shown to predict numerous health-related behaviours

Peer reviewed paper

SAGE Publications

10.1177/1757177409104596

including exercise (Von Ah et al, 2004), diet (Clark & Dodge, 1999) and sun protection behaviour (Myers & Horswill, 2006). Risk appraisal and perceived susceptibility (Schwarzer & Renner, 2000) have been shown to predict when a patient will take steps to reduce future risk, such as changing smoking behaviour (Hampson et al, 2006) and vaccination behaviour (Brewer et al, 2007), while the degree of stress experienced by a patient has been shown to be influential in determining whether patients adopt health behaviours such as maintaining oral health (Deinzer et al, 2005), maintaining diabetic control (Peyrot et al, 1999) and dietary compliance in haemodialysis (Hitchcock et al, 1992). Likewise the role of support is recognised as being important in predicting health behaviours (Jackson, 2006).

Given that there is considerable evidence to demonstrate that such variables can predict the long-term adoption of a range of health behaviours in patients, it is perhaps surprising that few studies have examined the relationship between these constructs and healthcare workers' health-related behaviours.

The small amount of research that has been undertaken supports the hypothesis that the degree of stress that a member of staff experiences, such as the level of workload, are important predictors of adherence to guidelines regarding handwashing. Pittet et al (1999) examined compliance with handwashing in a teaching hospital and reported that compliance decreased as the need for handwashing increased (an indication of workload). Similarly Bittner et al (2002) reported that handwashing compliance decreased as the patient to nurse ratio increased and Larson & Killien (1982) reported that in their sample of 193 health professionals the most important reason for not handwashing was being too busy.

Aims

This study examines the covariation between a range of psychological variables, including self-efficacy, perceived risk, perceived susceptibility and psychological distress (specifically occupational stress), and nurses' handwashing behaviour. The influence of other variables, including demographics, training received and the perceived support provided by the employing organisation towards handwashing are also explored.

Method

Design

A cross-sectional correlation design was used.

Participants/data collection

Participants were sampled from a large city centre acute hospital of approximately 579 beds. The wards approached included Cardiology, Dermatology, General Medicine, Haematology, Nephrology, Oncology, Respiratory, Surgery, Urology and Vascular.

In order to recruit as many participants as possible, one of the researchers (DH) attended ward rounds and team meetings to give a general overview of the study, take any questions and distribute the questionnaire packs. Potential participants were asked to decide whether or not they wished to participate in the study and to complete the questionnaires at their convenience. Participants were provided with written advice on the purpose of the study and reassured that all responses would be anonymous. If the participant decided to take part in the study they were asked to read and sign a consent form and to complete a battery of questionnaires in full. Participants were provided with stamped addressed envelopes in which to return the questionnaires. Questionnaires asked for demographic information on participants' gender, age, ethnic background, medical specialism, length of time worked in the NHS and whether or not their post requires 'hands on' contact with patients. The data were collected from March until May 2006.

All unpublished items were piloted ($n=4$) to determine the need for refinement. Feedback from the participants of this process led to some minor alterations to the wording of some items and to the exclusion of an additional measure of occupational stress – the Mental Health Professionals' Stress Scale.

Participants were presented with a statement relating to handwashing recommendations and were then asked to rate the frequency to which they felt they achieved this goal over a three-month period on a 10 cm visual analogue scale (VAS), with '0' representing 'never' and '10' representing 'always follow recommendation'. VASs have been demonstrated to be reliable and valid measures of subjective experience and have been used to measure mood (Folstein & Luria, 1973), pain (Joyce et al, 1975) and cigarette cravings (Glassman et al, 1984).

Similar scales were used to determine the 'importance' that respondents placed on adherence to recommendations regarding handwashing, the assistance that participants perceived their employing organisation to afford them in relation to handwashing, their perceptions of risk to themselves and others associated with not performing handwashing in accordance with trust guidelines, and the degree to which they believe that adhering to handwashing recommendations helps reduce the transmission of infections.

Other questions explored whether or not respondents had any formal training in handwashing techniques, who delivered this training and the format in which this training was delivered.

Two standard questionnaires were also used:

- Generalised self-efficacy scale (GSES; Schwarzer & Jerusalem, 1995). A 10 item self-report scale that assesses an individual's belief in their ability to respond to 'novel or difficult situations' and to overcome obstacles.
- Nursing stress scale (NSS; Gray-Toft & Anderson, 1981). A 34 item scale designed to measure occupational stress within nursing populations. A total stress score is obtainable, along with scores on seven subscales: death and dying, conflict with physicians, inadequate preparation, conflict with other nurses, workload, lack of support and uncertainty concerning treatment.

Ethical approval was obtained from the Trust Research Governance Committee and the NHS Office for Research Ethics Committees.

Results

Approximately 237 questionnaires were distributed to nursing staff, of which 76 were returned (rate of response=32%).

The average age of the participants was 34.3 years (SD=9.43; range=21–55). In terms of the gender of participants, three were males (3.9%) and 73 were females (96.1%). Most participants (70/76; 92.1%) were classified as 'European' and three (3.9%) were classified as 'Asian' (three respondents did not identify their ethnicity). The nurses' average length of time spent in the NHS was 12.9 years ($n=76$; range=0.50–37).

The entire sample indicated that their roles required 'hands on' contact with patients.

One way analysis of variance (ANOVA) was carried out to assess the effects of demographic variables on self-reported handwashing. Results show that gender [$F(1,74)=0.141$; $p=0.708$], ethnicity [$F(1,71)=0.414$; $p=0.522$] and job title [$F(1,74)=0.048$; $p=0.828$] were not significantly associated with self-reported handwashing.

Sixty seven (89.3%) respondents indicated that they had received some form of training in relation to handwashing. Training was most commonly provided by infection control staff ($n=25$; 32.9%). Physical demonstration was reported to be the most common form of delivery of training ($n=55$; 72.4%) followed by verbal instructions ($n=13$; 17.1%), posters ($n=3$; 3.9%) and information leaflets ($n=2$; 2.6%). However, receiving training was not significantly associated with self-reported handwashing [$F(1, 74)=1.77$; $p=0.188$].

Table 1 displays the descriptive statistics for all other variables. The sample reported that they observed handwashing recommendations approximately 77% of the time. Table 2 illustrates correlations between

covariates and self-reported handwashing. Four variables (perceived importance of handwashing, perceived risk to self, perceived risk to others and workplace assists handwashing) correlated at least moderately and significantly with self-reported handwashing.

Regression analyses

In order to examine the relative importance of the potential covariates of handwashing behaviour, a regression model was employed. The data were checked to ensure that the assumptions of linear regression were met. One of the assumptions underlying regression analysis is that no single data point has an undue influence on the outcome of the analysis. These are known as leverage points. In our analysis we found a single leverage point, i.e. one case that behaves differently from the remainder of the sample. As the purpose of the analysis is to summarise the relationships between variables within a group, then any case that does not conform to the remainder of the group is best removed, in order for the analysis to represent the sample. Removal of the outlier in these circumstances is common practice in regression analysis.

One case was removed for being an extreme outlier. All other regression assumptions were met. On the basis of the correlational analysis (see Table 2) four variables were entered into the regression: perceived importance of handwashing, perceived risk to self, perceived risk to others and workplace assists handwashing. A significant regression model emerged [$F(4, 70) = 12.129$; p 0.001], which explained 38% of the variance in handwashing behaviour (adjusted $R^2 = 0.376$; see Table 3).

Perceived importance of handwashing and the influence of the workplace were the strongest and only significant covariates from this model. These results were not surprising and it was felt that these variables may intervene in the relationships between other variables included in the questionnaire and self-reported handwashing. Therefore, further correlations and regression analyses were conducted to examine covariates of 'perceived importance of handwashing' and 'workplace assisting handwashing' in turn. The results of the correlation analyses are shown in Table 4.

Again, only those variables with a correlation coefficient of an absolute value of 0.2 or above (which, in this case, also meant all statistically significant correlations) were entered into the following two regressions (see Tables 5 and 6). The data were checked to ensure that the assumptions of linear regression were met, and again one case (the same case as in the previous regression analysis) was

Table 1. Descriptive statistics for frequency of handwashing behaviour, length of time worked in the NHS, occupational stress, general self-efficacy and perceptions of handwashing behaviour

Variable	*n*	Mean	Median	SD	Range	Potential range
Frequency of self-reported handwashing	76	7.69	8.00	2.04	0.40–10	0–10
Length of time spent in NHS (years)	76	12.71	7.50	10.5	0.50–37.00	
Generalised self-efficacy	76	30.08	30.00	3.60	23–38	0–40
Occupational stress	76	72.87	71.00	17.03	27–111	0–136
Perceived importance of handwashing	76	9.52	10.00	1.25	3–10	0–10
Perceived risk to self	76	8.73	9.10	1.63	2–10	0–10
Perceived risk to others	76	9.47	10.00	1.07	5–10	0–10
Transmission of infections	76	9.78	10.00	0.75	5–10	0–10
Workplace assist handwashing	76	8.96	10.00	2.03	0–10	0–10

Table 2. Correlations between demographic variables, stress, self-efficacy, perceptions of handwashing behaviour and frequency of self-reported handwashing

Variable	Frequency of self-reported handwashing (Pearsons' *r*)	*p*
Age of participant	0.09	0.47
Length of time spent in NHS (years)	0.01	0.92
Occupational stress	–0.08	0.46
Generalised self-efficacy	0.10	0.37
Perceived importance of handwashing	0.42	<0.001
Risk to self	0.33	<0.001
Risk to others	0.41	0.001
Transmission of infections	0.18	0.10
Workplace assist handwashing	0.42	<0.001
Training in handwashing	–0.10	0.41

Peer reviewed paper

Table 3. Covariates of 'frequency of self-reported handwashing'

	Unstandardised coefficients		Standardised coefficients		
Covariate	***β***	**Std. Error**	***β***	***t***	***p***
Perceived importance of handwashing	0.473	0.147	0.320	3.217	0.002
Perceived risk to self	0.121	0.125	0.101	0.967	0.337
Perceived risk to others	0.357	0.195	0.200	1.835	0.071
Workplace assist handwashing	0.323	0.087	0.352	3.703	<0.001

Table 4. Correlations between demographic variables, stress, self-efficacy, perceptions of handwashing behaviour and perceived importance of handwashing

Covariates	Perceived importance of handwashing (Pearsons' *r*)	*p*	Workplace assists handwashing (Pearsons' *r*)	*p*
Age of participant	0.10	0.391	–0.08	0.160
Length of time spent in NHS (years)	0.04	0.724	0.16	0.250
Occupational stress	–0.01	0.923	0.23*	0.045
Generalised self-efficacy	–0.09	0.450	0.18	0.129
Risk to self	0.12	0.318	0.04	0.763
Risk to others	0.28*	0.015	0.07	0.562
Transmission of infections	0.44†	<0.001	–0.08	0.489
Training in handwashing	0.04	0.706	–0.23*	0.049

*$p<0.05$; †$p<0.001$

Table 5. Covariates of 'Perceived importance of handwashing'

	Unstandardised coefficients		Standardised coefficients		
Covariate	***β***	**Std. Error**	***β***	***t***	***p***
Transmission of infection	0.691	0.214	0.411	3.233	0.002
Perceived risk to others	0.055	0.150	0.047	0.369	0.714

removed for being an extreme outlier. All other regression assumptions were met.

In relation to the variable 'perceived importance of handwashing', a significant regression model emerged [$F(2, 72)=8.71$; $p<0.001$], which explained 19% of the variance (adjusted $R^2=0.17$). The model shows that participants' perceptions regarding the transmission of infection was the strongest (and statistically significant) covariate (see Table 5).

In relation to the variable 'workplace assists handwashing', a significant regression model emerged [$F(2, 72)=4.33$; $p=0.017$], which explained 11% of the variance (adjusted $R^2=0.08$). Occupational stress and whether or not training was received in handwashing contributed similarly (and significantly) to the explanation of the variance in how much the workplace is perceived to assist handwashing (see Table 6).

Discussion

Nurses in this study were more likely to wash their hands if they reported perceiving the importance of doing so and if they reported that their workplace assists them in doing so. However secondary regression models demonstrate that other factors should also be considered when designing programmes aimed at improving handwashing rates. The best covariate of perceived importance was how strongly a nurse believed in the potential for poor handwashing practice to contribute to the transmission of infections. This issue should therefore be highlighted in all interventions.

Table 6. Covariates of 'Workplace assist handwashing'

	Unstandardised coefficients		Standardised coefficients		
Covariate	***β***	**Std. Error**	***β***	***t***	***p***
Occupational stress	–0.028	0.013	–0.237	–2.126	0.037
Training in handwashing	–0.004	0.002	–0.231	–2.077	0.041

The role of the organisation in providing a supportive workplace should also be considered. Nurses who regarded their employers as supportive were much more likely to adhere to handwashing guidelines. Occupational stress was seen to reduce the perception of having a supportive employer. As such it is important to recognise that organisations need to both facilitate handwashing and to protect their staff from factors that have a detrimental impact, such as occupational stress.

Whether or not a nurse had received training in handwashing was not directly related to self-reported handwashing. The results suggest, however, that those nurses who had received training were significantly more likely to regard their employers as being helpful (see Table 4). This variable was itself observed to be associated with self-reported handwashing (see Table 6): it may well be therefore that by allocating time to training in handwashing, employers create a perception among nurses that they are interested in their wellbeing.

Although the importance of self-efficacy within the health behaviour change literature has been well documented, this study failed to find any association beyond a very weak association between self-efficacy and self-reported handwashing behaviour. A number of possible explanations might account for this finding. Handwashing is a relatively simple behaviour and it may well be that self-efficacy becomes more important as the complexity of the behavioural demand increases. Alternatively further examination using a measure specific to handwashing may be more sensitive to any potential association between these variables. It should also be noted that this group of nurses reported generally high levels of self-efficacy and there may have been insufficient range in scores to establish potential for discrimination.

Limitations

Several issues limit the generalisability of these results. Most important, the sample was self-selecting. It is not possible therefore to claim that the opinions of those who chose to take part in this study are representative of those who did not. However, it should be noted that those who did participate were experienced nurses with an average of 12.9 years in the NHS. The sample was also mostly comprised of females and was small in size, which again limits the representativeness of the findings.

In conclusion, this study demonstrates that with regard to this sample that psychological variables such as perception of importance, perception of workplace support, occupational stress and perception of risk were important covariates of handwashing behaviour in nurses. Interventions aimed at increasing nurses' perception of the importance of this health behaviour and measures that influence nurses' perceptions regarding the supportiveness of their employer (such as initiatives to reduce occupational stress) may contribute to longer term changes in handwashing behaviour. More research should examine the role of other psychological processes and models in infection control.

Acknowledgments

The authors acknowledge and thank those nursing staff who took the time to participate in this study.

References

Ajzen I. (1985) From intentions to actions: a theory of planned behaviour. In. J Kuhl and J Beckmann (Eds) *Action-control: from cognition to behaviour*. Springer-Verlag: Heidelberg.

Ajzen I. (1991) The theory of planned behaviour. *Organizational Behaviour and the Human Decision Process* **50**: 179–211.

Bandura A. (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review* **84**: 191–215.

Bittner MJ, Rich EC, Turner PD, Arnold Jr. WH (2002) Limited impact of sustained simple feedback based on soap and paper towel consumption on the frequency of handwashing in an adult intensive care unit. *Infection Control and Hospital Epidemiology* **23**: 120–6.

Brewer NT, Chapman GB, Gibbons FX, Gerrard M, McCaul KD, Weinstein ND. (2007) Meta-analysis of the relationship between risk perception and health behaviour: the example of vaccination. *Health Psychology* **26(2)**: 136–45.

Clark NM, Dodge JA. (1999) Exploring self-efficacy as a predictor of disease management. *Health Education & Behaviour* **26(1)**: 72–89.

Deinzer R, Granrath N, Spahl M, Linz S, Waschul B, Herforth A. (2005) Stress, oral health behaviour and clinical outcome. *British Journal of Health Psychology* **10**: 269–83.

Feather A, Stone SP, Wessier A, Boursicot KA, Pratt C. (2000) Now please wash your hands: the hand washing behaviour of final MBBS candidates. *Journal of Hospital Infection* **45(1)**: 62–4.

Folstein MF, Luria R. (1973) Reliability, validity and clinical application of the visual analogue mood scale. *Psychological Medicine* **2**: 479–86.

Glassman AH, Jackson WK, Walsh BT, Roose SP. (1984) Cigarette craving, smoking withdrawal and clonidine. *Science* **226**: 864–6.

Gray-Toft P, Anderson JG. (1981) The Nursing Stress Scale: development of an instrument. *Journal of Behavioural Assessment* **3(1)**: 11–23.

Hampson SE, Andrews JA, Barckley M, Lichtenstein E, Lee ME. (2006) Personality traits, perceived risk, and risk-reduction behaviours: a further study of smoking and radon. *Health Psychology* **25(4)**: 530–6.

Hitchcock PB, Brantley PJ, Jones GN, McKnight GT. (1992) Stress and social support as predictors of dietary compliance in haemodialysis patients. *Behavioural Medicine* **18**: 13–21.

Jackson T. (2006) Relationships between perceived close social support and health practices within community samples of American women and men. *Journal of Psychology* **140(3)**: 229–46.

Joyce CRB, Zutski EW, Hrubes V, Mason RM. (1975) Comparison of fixed interval and visual analogue scales for rating chronic pain. *European Journal of Clinical Pharmacology* **8**: 514–20.

Peer reviewed paper

Larson E, Killien M. (1982) Factors influencing hand washing behaviour of patient care personnel. *American Journal of Infection Control* **10**: 93–9.
Larson E, Kretzer EK. (1995) Compliance with hand washing and barrier precautions. *Journal of Hospital Infection* **30**: 88–106.
Larson EL, Bryan JL, Adler LM, Blane C. (1997) A multi-faceted approach to changing hand washing behaviour. *American Journal of Infection Control* **25(1)**: 3–10.
Myers LB, Horswill MS. (2006) Social cognitive predictors of sun protection intention and behavior. *Behavioral Medicine* **32(2)**: 57–63.
Naikoba S, Hayward A. (2001) The effectiveness of interventions aimed at increasing hand washing in healthcare workers – a systematic review. *Journal of Hospital Infection* **47(3)**: 173–80.
Nobile CG, Montuori P, Diaco E, Villari P. (2002) Healthcare personnel and hand decontamination in intensive care units: knowledge, attitudes, and behaviour in Italy. *Journal of Hospital Infection* **51(3)**: 226–32.
Peyrot M, McMurry Jr JF, Kruger DF. (1999) A biopsychosocial model of glycaemic control in diabetes: stress, coping and regimen adherence. *Journal of Health and Social Behaviour* **40**: 141–58.
Pittet D, Mourouga P, Perneger TV and the members of the infection control programme. (1999) Compliance with handwashing in a teaching hospital. *Annals of Internal Medicine* **130(2)**: 126–30.
Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S, Perneger T. (2000) Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Lancet* **356**: 1307–12.
Prochaska J, DiClemente C. (1983) Stages and processes of self-change of smoking: towards an integrated model of change. *Journal of Consulting and Clinical Psychology* **51**: 390–5.
Rosenstock IM. (1974) Historical origins of the health belief model. *Health Education Monographs* **2**: 1–8.
Schwarzer R, Jerusalem M. (1995) Generalised self-efficacy scale. In J Weinman, S Wright, and M Johnston (Eds.) *Measures in health psychology: a user's portfolio. Causal and control beliefs*. NFER-NELSON: Windsor, UK, pp. 35–7.
Schwarzer R, Renner B. (2000) Social-cognitive predictors of health behaviour: action self-efficacy and coping self-efficacy. *Health Psychology* **19(5)**: 487–95.
Teare L, Cookson B, Stone S. (2001) Hand hygiene. Use alcohol rubs between patients: they reduce the transmission of infection. *British Medical Journal* **323**: 411–12.
Von Ah D, Ebert S, Ngamvitroj A, Park N, Kang D. (2004) Predictors of health behaviours in college students. *Journal of Advanced Nursing* **48(5)**: 463–74.

Peer reviewed paper