



# Acceptability of temporary suspension of visiting during norovirus outbreaks: investigating patient, visitor and public opinion

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## SUMMARY

**Background:** Noroviruses are a leading cause of outbreaks globally and the most common cause of service disruption due to ward closures. Temporary suspension of visiting (TSV) is increasingly a recommended public health measure to reduce exposure, transmission and impact during norovirus outbreaks; however, preventing patient–visitor contact may contravene the ethos of person-centred care, and public acceptability of this measure is not known.

**Aim:** To investigate the acceptability of TSV during norovirus outbreaks from the perspectives of patients, visitors and the wider public.

**Methods:** Cross-sectional survey of patients ( $N = 153$ ), visitors ( $N = 175$ ) and the public ( $N = 224$ ) in three diverse areas in Scotland. Health Belief Model constructs were applied to understand ratings of acceptability of TSV during norovirus outbreaks, and to determine associations between these levels and various predictor variables.

**Findings:** The majority (84.6%) of respondents indicated that the possible benefits of TSV are greater than the possible disadvantages. Conversely, the majority (70%) of respondents disagreed that TSV 'is wrong as it ignores people's rights to have contact with family and friends'. The majority (81.6%) of respondents agreed that TSV would be more acceptable if exceptions were made for seriously ill or dying patients. Correlational analysis demonstrated that overall acceptability was positively related to perceived severity ( $r = 0.65$ ), identified benefits ( $r = 0.54$ ) and implementing additional communication strategies ( $r = 0.60$ ); acceptability was negatively related to potential barriers ( $r = -0.49$ ).

**Conclusions:** There is greater service user and public support for the use of TSV than concerns around impinging upon patients' rights to have visitors. TSV should be considered as an acceptable infection control measure that could be implemented consistently during norovirus outbreaks.

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## Introduction

Noroviruses are a significant worldwide cause of gastroenteritis, and outbreaks occur in settings where there is shared occupancy, including hospitals and care homes.<sup>1</sup> Noroviruses have been described as ‘perhaps the perfect human pathogens’; they are highly contagious, shed rapidly and prolifically, evolve constantly, evoke limited immunity, and most infected patients recover fully to maintain a pool of susceptible hosts.<sup>2</sup> Noroviruses have the ability to cause outbreaks because of a low infectious dose, presence of vomiting and/or diarrhoea that contaminates the environment heavily, and close proximity of susceptible persons.<sup>3,4</sup> Cross-transmission arises through direct and indirect contact; in hospitals and other care environments, it is often necessary to close the affected areas to admissions and to restrict staff movement to control an outbreak.<sup>5,6</sup>

Another possible, although less researched, means of reducing the incidence and duration of outbreaks is to reduce the pool of possible new cases by reducing the flow of visitor ‘traffic’. There are several scenarios where visitors could play a role in prolonging the outbreak via possible transmission pathways. Visitors can be exposed to norovirus and become infected, potentially resulting in more widespread contamination of the care environment should they touch uncontaminated surfaces.<sup>7</sup> This situation is likely, in part, because contaminated surfaces cannot be recognized as such, and noroviruses are stable on surfaces within the care environment for up to one month.<sup>8</sup> During peak periods, noroviruses are also circulating in the community; thus, even ‘well’ visitors can introduce norovirus to the care setting.<sup>9</sup> Norovirus symptoms start abruptly; visitors could leave home well and be symptomatic on arrival at the ward through community-acquired norovirus, and thereby start an outbreak.<sup>10</sup> In a four-month study of norovirus strains in one district general hospital, eight distinct genetic clusters of norovirus GII-V were identified; the authors concluded that, as the introduction of norovirus into the care setting cannot be prevented, efforts should be targeted at limiting spread.<sup>11</sup>

Whilst norovirus outbreaks are of international concern, and restricting visiting is gaining recognition as an infection control measure,<sup>5,6</sup> the use of this approach is not universal. Whilst enforcing temporary suspension of visiting (TSV) could be a simple public health measure, wide-scale policy-based adoption of TSV may be considered to contravene patients’ and visitors’ rights, and run contrary to the contemporary health-care ethos of person-centred care.<sup>12,13</sup> Given these concerns and the lack of evidence on the public acceptability of such a strategy, it is not policy in the Scottish health service to implement TSV routinely during norovirus outbreaks. Responding to this issue, this study investigated the acceptability of TSV during norovirus outbreaks in hospitals and care homes in Scotland from the perspectives of patients, visitors and the wider public. The goal was to generate an evidence base for policy development in both the Scottish and wider international context.

## Objectives

The aims of this study were to quantify levels of acceptability of TSV during norovirus outbreaks, and to determine

associations between these levels and various predictor variables from the perspectives of patients, visitors and the wider public.

## Methods

A three-stage sequential mixed-method study was used.<sup>14</sup> Stage 1 described current TSV implementation in Scotland,<sup>15</sup> and Stage 2<sup>16</sup> involved Nominal Group Technique<sup>17</sup> discussions with seven groups of service users and clinicians to elicit and rank-order situational and contextual factors that might make TSV during norovirus outbreaks more or less acceptable. Group discussions were structured around a theoretical framework drawn from the Health Belief Model<sup>18</sup> [i.e. attitude (positive and negative feelings about TSV in a range of situations), perceived severity of norovirus, perceived benefits of TSV (e.g. effectiveness in reducing the spread of norovirus) and perceived costs (e.g. that TSV contravenes patients’ rights)]. Stage 3, reported here, used the resultant factors, which were developed into 18 questionnaire items for a paper-based, self-completion, cross-sectional survey. The questionnaire was assessed for ‘plain English’ and piloted, with minor changes made to the wording to enhance comprehension prior to distribution.

Acceptability of TSV was determined by agreement with the items based on the Health Belief Model (wording of items shown in Table II). The final item in the section of the questionnaire about TSV was designed to capture a global aspect of acceptability: ‘Overall, the possible benefits of closing a hospital ward or care home to visitors during a winter vomiting bug outbreak are greater than the possible disadvantages.’ Other associated factors that emerged from the nominal group discussions included attitudes to exceptions to TSV for patients and visitors, and attitudes to additional communication strategies during TSV (Table II). Demographic variables included whether the respondent was a patient, visitor or member of the public; age group; sex; occupational category; personal experience of norovirus; and current or previous employment within the health service or care homes.

Ethical approval was granted by Glasgow Caledonian University. Access to National Health Service (NHS) premises for data collection from patients and visitors was approved via appropriate local mechanisms. For patients, capacity to consent was assessed by the nurse in charge on the day of data collection. Data collectors were not directly involved in care delivery, and participants were informed on the questionnaire that they could leave any question unanswered.

## Sample and recruitment

A power calculation estimated that a total sample of around 500 participants was required.<sup>19</sup> The population comprised all hospital inpatients, visitors and the public on the edited version of the Electoral Roll within three geographical case-site NHS boards (urban, rural, remote). A convenience sample of 153 patients and 175 visitors was recruited from hospitals in the three case sites; questionnaires were distributed to patients and visitors via local co-ordinators, and collected later on the same day over a period of two to three weeks in 2014. Using recognized sampling methods,<sup>20</sup> a randomized sample of the wider public ( $N = 1100$ ) was drawn from edited versions of the

**Table I**  
Demographic and descriptive characteristics of respondents

	Patients	Visitors	Public	Total
	N (%)	N (%)	N (%)	N (%)
Sex				
Male	67 (43.8)	74 (42.3)	91 (41.0)	232 (42.0)
Female	86 (56.2)	101 (57.7)	131 (59.0)	320 (58.0)
Age (years)				
≤45	16 (10.5)	47 (26.9)	48 (21.5)	111 (20.2)
46–65	32 (21.1)	70 (40.0)	102 (45.7)	204 (37.1)
≥66	104 (68.4)	58 (33.1)	73 (32.7)	235 (42.7)
Occupation				
Professional, managerial, skilled	15 (10.6)	26 (17.4)	60 (28.8)	101 (20.2)
Semi-skilled, manual	20 (14.1)	48 (32.2)	60 (28.8)	128 (25.7)
Not employed outside home	6 (4.2)	12 (8.1)	14 (6.7)	32 (6.4)
Retired, unemployed (no further details)	101 (71.1)	63 (42.3)	74 (35.6)	238 (47.7)
Worked in health care, NHS or care home				
Yes	14 (9.4)	31 (17.8)	46 (20.6)	91 (16.7)
No	135 (90.6)	143 (82.2)	177 (79.4)	455 (83.3)
Personal experience of norovirus				
Had norovirus	25 (16.3)	33 (18.9)	44 (19.7)	102 (18.5)
Not had norovirus	128 (83.7)	142 (81.1)	179 (80.3)	449 (81.5)
Know someone who has had norovirus	35 (22.9)	63 (36.4)	83 (37.7)	181 (33.2)
Do not know someone who has had norovirus	118 (77.1)	110 (63.6)	137 (62.3)	365 (66.8)

NHS, National Health Service.

electoral rolls within case-site areas, and 224 responded. Overall, 1470 questionnaires were distributed, 44 postal questionnaires were returned as undeliverable, and 597 fully or partially completed questionnaires were returned in total. This provided an overall response rate of 42%, although 45 (7.5%) respondents were excluded prior to analysis because of the extent or nature of missing responses. The final sample included 552 respondents. Only 34 (6%) respondents came from the remote area, so geographical area was not included as a variable in further analysis.

### Analysis

Data were analysed using Statistical Package for the Social Sciences Version 21 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated and variables were transformed as necessary to correct for skew. Agreement was measured on a 10-point scale from 1 ('strongly disagree') to 10 ('strongly agree'). A 'don't know' option was also provided, recoded as the mid-point value in certain analyses. Following this, non-parametric analyses [Kruskal-Wallis (K-W), Mann-Whitney *U* and Spearman's rho] were conducted to address the research objective.

### Results

A description of the sample is provided in Table I. The group of patients contained a significantly greater proportion of people aged over 65 years than was found in the group of visitors or the public [ $\chi^2(4) = 58.98, P < 0.001$ ]. In line with this, a high proportion (71%,  $N = 101$ ) of patients were classed as retired. Twenty-one percent of the public had worked in health care ( $N = 46$ ), which was a significantly higher proportion than

was noted for patients [ $\chi^2(2) = 8.36, P = 0.015$ ]. The groups did not differ in terms of personal experience of a norovirus infection; however, public respondents were more likely than patients to know someone else who had been infected [ $\chi^2(2) = 10.20, P = 0.006$ ].

'Agreement' was determined by combining 'agree' and 'strongly agree' responses. Agreement with the global acceptability statement was high (84.6%,  $N = 462$ ). Agreement with the statements reflecting severity of infection, the benefits of TSV, and implementing communication strategies was similarly high. Agreement with statements reflecting exceptions varied from 52% (for exceptions for caregivers) to 82% (for seriously ill or dying patients) (see Table II). Agreement with these statements did not vary significantly according to the category of respondent (whether patient, visitor or wider public), sex or occupation. No difference was noted between those who had worked in the NHS or care home sector and those who had not. Marginal differences were found according to personal experience of norovirus. The most notable differences were according to age group. Those under the age of 46 years were less likely to agree with the global acceptability statement (K-W  $\chi^2 = 9.29, P < 0.010$ ) and the perceived benefits of TSV (K-W  $\chi^2 = 22.53, P < 0.001$ ), and more likely to agree with the perceived 'costs' of TSV (K-W  $\chi^2 = 8.04, P = 0.018$ ).

Table III shows the correlations among the acceptability, exceptions and communication scales. Perceived severity of infection was strongly related to the global acceptability item, as were perceived benefits of TSV and the use of communication strategies. Perceived 'costs' were negatively related to the global acceptability item, perceived severity and perceived benefits, and positively related to agreement with making exceptions to TSV.

**Table II**

Levels of agreement with statements relating to Health Belief Model constructs reflecting acceptability, factors addressing exceptions to temporary suspension of visiting (TSV), and effective communication

Factor	Alpha	Questionnaire statement	Agreement <sup>a</sup> N (%)
<b>Health Belief Model constructs</b>			
Perceived severity		'The effects of norovirus for hospital patients or care home residents are severe'	474 (87.4)
Perceived benefits	0.63	1. TSV '... would reduce the spread of the bug'	493 (90.2)
		2. TSV would 'avoid embarrassment for patients and residents who are vomiting or who have diarrhoea'	479 (87.9)
Perceived barriers or costs	0.69	1. TSV '... is wrong as it ignores people's rights to have contact with family and friends'	141 (25.8)
		2. 'Hospital wards or care homes should NOT be closed during winter vomiting bug outbreaks because patients, care home residents and visitors would be very upset'	132 (24.4)
Global acceptability item		'Overall, the possible benefits of closing a hospital ward or care home to visitors during a winter vomiting bug outbreak are greater than the possible disadvantages'	462 (84.6)
<b>Factors related to improving acceptability by:</b>			
'Closing a hospital ward or care home during a winter vomiting bug outbreak would be acceptable if the nurse in charge made EXCEPTIONS for:'	0.89	1. Seriously ill or dying patients	444 (81.6)
		2. Children	375 (69.5)
		3. Those who might become very distressed or agitated	345 (64.2)
		4. Those who have learning disabilities	307 (56.4)
		5. Those who have dementia	296 (54.3)
		6. Visitors who have travelled a long way	292 (53.8)
		7. Visitors who are the patients' caregivers	282 (52.4)
No exceptions		There should be NO exceptions to the TSV rule	280 (51.7)
Communication strategies: 'It would be more acceptable to close a hospital ward or care home to visitors during a winter vomiting outbreak if:'	0.82	1. Informing next-of-kin before visiting	487 (89.3)
		2. Permitting communication through mobile phones or Skype	492 (89.9)
		3. A local radio announcement	440 (80.7)
		4. A national media campaign	428 (78.5)

<sup>a</sup>  $\geq 6$  on 1–10 scale.

## Discussion

The impact of a norovirus outbreak on patients and on the NHS is extensive.<sup>21</sup> However, it is imperative that control measures designed to reduce transmission do not have a detrimental impact on patients or their families. To the authors' knowledge, this is the first study to investigate patient, visitor and public views on the acceptability of TSV during norovirus outbreaks, and the findings have shown that this measure is generally acceptable. Theoretical constructs from the Health Belief Model<sup>18</sup> were used to explore the acceptability of TSV in relation to perceived severity of norovirus, and perceived 'costs' and benefits of TSV. Attitudes to exceptions for patients and visitors to TSV, and attitudes to communication strategies during TSV were also explored.

Visitors have a role to play in the prevention and control of the spread of norovirus, should an outbreak occur.<sup>8–11</sup> Whilst research indicating the effectiveness of TSV in shortening the duration of outbreaks is limited (the authors could not locate any published evidence), and based on the assumption that reducing the number of new persons who could be exposed to norovirus will reduce the length of the outbreak, the findings demonstrated a high level of agreement with the perceived beneficial effect of TSV in managing outbreaks by reducing spread of the virus. Beliefs around the perceived severity of

norovirus were more strongly correlated with overall acceptability ratings than any other factor investigated, and the use of TSV to minimize embarrassment for patients with vomiting or diarrhoea generated strong agreement.

It is a social norm to visit a sick relative or friend. In a recent study,<sup>22</sup> 13 out of 424 identified index cases for norovirus were visitors; contrary to government advice,<sup>23</sup> nine out of these 13 individuals had visited despite the fact that they were symptomatic before visiting. Despite these societal expectations, there was broad disagreement with suggestions that TSV should not be used because patients or visitors would become upset, and that TSV ignores people's rights to have contact with family and friends. However, there was also clear support for the notion that exceptions should be made when the patient was seriously or terminally ill.

In summary, the majority view of the study respondents was that, 'Overall, the possible benefits of closing a hospital ward or care home to visitors during a winter vomiting bug outbreak are greater than the possible disadvantages'. Norovirus is perceived to have severe consequences for those affected, meriting TSV. All other measures of acceptability of TSV supported this view, with respondents indicating that they believed it would be beneficial by reducing the spread of norovirus, and would improve patients' dignity by reducing embarrassment for patients who were vomiting or had

**Table III**

Correlations (Spearman's rho) among items reflecting acceptability of temporary suspension of visiting (TSV), exceptions and communication strategies

Alpha	Item or scale	1	2	3	4	5
1	— Overall, the possible benefits of closing a hospital ward or care home to visitors during a winter vomiting bug outbreak are greater than the possible disadvantages	—				
2	— The effects of norovirus for hospital patients or care home residents are severe	0.65**	—			
3	0.63 Benefits of TSV	0.54**	0.43***	—		
4	0.69 'Costs' of TSV	−0.49**	−0.31***	−0.37**	—	
5	0.89 Exceptions	−0.09*	0.08	0.10*	0.36**	—
6	0.82 Communication	0.60**	0.48***	0.43**	−0.33**	0.09*

\* $P < 0.05$ ; \*\* $P < 0.001$ .

diarrhoea. The study findings indicate greater service user and public support for the view that TSV aids the management of norovirus outbreaks, than concerns around patients' rights to have visitors.

Providing additional value for clinical practice, these findings identify ways to enhance the acceptability of TSV by using radio and media campaigns to improve awareness of the need for this measure, emphasizing those elements related to greater acceptability (i.e. highlighting the consequences of norovirus, explaining that TSV could reduce the spread of norovirus) and challenging views about the potential upset to patients when TSV is introduced. Implementing a range of strategies to maintain non-contact communication between patients and visitors, and ensuring adequate information for visitors were proposed as additional means to enhance the acceptability of TSV.

Earlier work from Stage 1<sup>15</sup> showed that the use of TSV was inconsistent in Scotland, and this arose, in part, due to a lack of a national policy on TSV and also due to concern around potential public response to this measure. These findings have demonstrated that, as part of an overall norovirus control policy, TSV would be acceptable to patients, visitors and the wider public.

Consequently, a standardized approach to implementing TSV in practice would be generally acceptable. This would normalize both the process and the expectations of visitors, in that they would expect TSV to be in place for visitor and patient safety and for patient dignity. Normalization would also enable wards to become experienced at communicating the TSV sensitively, with consistency around exceptions to be made based on their patient/resident population and particular situations.

The limitations of this study are acknowledged. Whilst the sample was drawn from three distinct geographical areas, it was not possible to use geographical area as a variable in the analysis. The patient sample excluded those who were more seriously ill, and respondents from the public sample tended to be older and have higher socio-economic status than a random sample. In addition, the public sample included a relatively high proportion of people who had worked in healthcare or care home settings. In relation to the analysis, responses to many items, including the key outcome variable of acceptability, were highly skewed; although transformations to address this were put in place, the analysis cannot be classed as robust.

A key strength in the overall design was the 'bottom up' involvement of service users and clinicians in determining the factors deemed relevant to TSV, enabling construction of a survey tool grounded in the views of those most affected. Having considered more complex health psychology frameworks, such as the Theoretical Domains Framework,<sup>24</sup> the use of the Health Belief Model<sup>18</sup> provided a simple yet flexible framework to guide data collection and analysis, focusing as it did on perceived severity, benefits and barriers to TSV.

## Conclusions

TSV as a control measure to reduce transmission of norovirus to and via visitors appears to be acceptable to patients, visitors and the public in Scotland, although exceptions might be made for patients who are seriously or terminally ill.

Acceptability may be further enhanced by implementation of communication strategies to raise public awareness via local and national media campaigns, and by enabling ongoing patient–visitor contact (e.g. via mobile phone).

Based on these findings, national policy with clear guidance on the use of and exceptions to TSV should be developed to reduce inconsistencies in this practice.

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### Conflict of interest statement

None declared.

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