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Original Research

Influenza A(H1N1)pdm09 and flu response centres: Characteristics of flu response centre staff in the West Midlands

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SUMMARY

Objective: To assess the operational experience and knowledge of staff who worked in the West Midlands Flu Response Centre (FRC) during the ‘containment’ phase of influenza A(H1N1)pdm09.

Study design: Evaluation study.

Methods: Cross-sectional survey of staff who worked in the West Midlands FRC between 18 May 2009 and 10 July 2009 using an online self-administered questionnaire. The questionnaire included sections related to the respondents’ FRC experience, knowledge about influenza A(H1N1)pdm09 and the containment phase.

Results: This study had a 51% (89/176) response rate. Of the respondents, 59% were female, 64% were of White ethnicity, 55% were clinicians, 46% were aged 25–44 years, and 67% had no previous call centre experience. A significant proportion ($P < 0.001$) of respondents believed that the FRC had made a positive contribution to the public health management of the containment phase. Nearly all respondents indicated that they were familiar with the terms ‘pandemic flu’ or ‘influenza pandemic’ (99%), understood the aim of the containment phase (90%), and knew the severity of the illness caused by the virus (97%). However, specific knowledge was lacking regarding a number of public health interventions, and overall knowledge scores for clinicians and non-clinicians were similar.

Conclusion: This study is the first to report on the characteristics of FRC staff during the containment phase of influenza A(H1N1)pdm09 pandemic. Although overall, staff evaluation of the West Midlands FRC was very positive, a number of knowledge gaps were identified. This study provides valuable insights which can contribute to preparedness planning.

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Introduction

In the UK, the first known case of influenza A(H1N1)pdm09 was reported in Scotland on 27 April 2009.¹ In the West Midlands region, the first confirmed case was reported on 29 April 2009.² By 2nd July (end of the containment phase), the region accounted for 42% of laboratory-confirmed cases in England.³ The public health response to control the spread of
influenza A(H1N1)pdm09 was based on a number of phases described in pandemic preparedness plans. The aim of the first phase (the ‘containment phase’) was to slow the spread of the virus, and to facilitate better understanding of the virus and the evolving pandemic. This included providing public health advice; gathering epidemiological data; and early identification, isolation, testing and treatment of possible cases.

Multi-agency regional Flu Response Centres (FRCs) [coordinated by the Health Protection Agency (HPA)] were introduced to coordinate the operations of the containment phase, and to support the National Health Service (NHS) in England. These were telephone help and advice centres established at short notice to provide specialist advice on influenza A(H1N1)pdm09 to health professionals; and to liaise with general practitioners and the wider NHS on the diagnosis, testing and treatment of cases, and, where appropriate, follow-up of their contacts. In England, the West Midlands FRC was one of the first to be established and commenced operations on 18 May 2009, 3 weeks after identification of the first case.

As the number of reported cases in the region accelerated and public concern increased, the remit of the FRC was widened to meet the increasing number of enquiries received from non-NHS organizations as well as members of the public. HPA staff from across the region were recruited to work in the FRC, and staffing levels were augmented by sourcing personnel from other HPA regions, as well as NHS sources and non-NHS sources. Staff recruited to work in the FRC were trained for half a day, mainly in how to use the case management software and FRC operational arrangements. Information on influenza A(H1N1)pdm09 was provided in FRC briefing packs.

When establishing helplines, it is recommended that staff should have a number of attributes including appropriate knowledge of the subject. However, little is known about the attributes of FRC staff. This study aims to provide an overview of West Midlands FRC staff, their disease-specific and precautionary behaviour knowledge, and their experience of FRC working arrangements in order to inform future planning for similar activities.

Methods

Respondents

A retrospective cross-sectional survey of staff who had worked in the West Midlands FRC from 18 May 2009 to 10 July 2009 was conducted. A 25-item self-administered questionnaire was developed with the aim of examining different aspects of FRC operational arrangements and staff attributes. The questionnaire consisted of items in the form of Likert-scale, multiple-choice questions and a limited number of open-ended questions. The questionnaire included questions on demographic attributes, experience of working arrangements, training received in the FRC, Fluzone (a case-management tool designed for FRCs to collect detailed epidemiological data using standardized algorithms), sources of information on influenza A(H1N1)pdm09 (or ‘swine flu’ as it was then known), and an 11-item knowledge (true/false) section about influenza A(H1N1)pdm09 and the containment phase. Answers to the knowledge section were based on a review of the available literature, policies and guidelines produced by the Department of Health, HPA and World Health Organization at the time of the survey design. A pilot study was conducted on a convenience sample of West Midlands HPA staff who had worked in the FRC. As a result, a number of minor changes were made to the questionnaire. Survey Monkey was used to provide respondents with anonymized online access to the questionnaire. The link to the survey was emailed to former FRC staff on 23 October 2009, and two reminders were emailed at 2-week intervals. The email addresses used were provided by the FRC training manager, and no other identifying information was given. This meant that individual respondents could not be identified and reminders were therefore sent to all potential respondents. Data collection was closed on 30 November 2009.

For the purposes of this study, FRC staff were divided into two categories based on their response to the question: ‘Which of these best describes your occupation?’ These were ‘clinical’ (medical doctors and nurses) and ‘non-clinical’ (other staff) categories. Non-respondents to this question or those whose professional status was unknown and meant that they could have been either clinical or non-clinical staff (e.g. as public health trainees) were excluded from this analysis.

Data analysis

Responses were analysed based on the total number of respondents to each question, and non-responders to individual questions were excluded from the analysis of those questions. Variables based on a four-point scale were collapsed into two categories to facilitate analysis. Results are presented as percentages with 95% confidence intervals (CI). Yates’s corrected Chi-squared statistic and (where appropriate) Fisher’s exact test were employed for analysing 2 × 2 tables. Microsoft Excel 2007 (Microsoft Corporation, Redmond, USA) was used for descriptive frequency analysis, and STATA Version 10 (StataCorp, College Station, TX, USA) was used for cross-tabulations. Answers to open-ended questions are not included in the data analysis due to the low number of responses.

Results

Characteristics of the sample and response

Overall, 190 former FRC staff were sent an e-mail inviting them to participate in the survey. A response rate of 51% (89/176) was obtained, as 14 e-mails could not be delivered to the intended recipient. Table 1 shows that most respondents were female (59%, 41/70) and clinicians. A significantly greater proportion of staff were aged 25–44 years compared with other age groups (P < 0.0001), and staff were more likely to be from a White ethnic background (P < 0.003). Significantly fewer FRC staff reported previous experience of working in a call centre (Table 1) compared with those with prior experience.
Knowledge of influenza A(H1N1)pdm09 and precautionary behaviour

Nearly all respondents indicated that they were familiar with the terms ‘pandemic flu’ or ‘influenza pandemic’ (99%, 72/73). A significant proportion of respondents (91%) correctly identified the definition of an influenza pandemic, understood the aim of the containment phase (90%), and knew that the illness caused by the virus was mild in most cases (97%) (Table 3).

However, respondents were less assured when it came to understanding management guidelines: 73% (48/66) stated that antiviral drugs could cure illness due to the pandemic virus, and 89% (59/66) believed that influenza A(H1N1)pdm09 could be treated successfully using antibiotics.

Correct knowledge of precautionary behaviour also varied. All respondents knew that staying at home while ill would reduce the spread of influenza A(H1N1)pdm09, and a significant proportion correctly stated that frequent handwashing could be used to prevent the spread of virus (Table 3). However, 77% (48/62) of respondents believed that the virus could be prevented from spreading by wearing face masks in public, while 56% (35/63) believed that spread could be prevented by not travelling abroad to areas already affected by influenza A(H1N1)pdm09.

Association between professional status and responses

The median knowledge score was 9 (range 6–11) out of a possible 11 for clinicians, and 10 (range 5–11) for non-clinicians. There were no significant differences in the proportion of clinicians and non-clinicians providing correct responses for 10 of the 11 items in this section. In comparison with non-clinicians, all clinicians agreed with the statement that spread of the virus can be prevented by frequent handwashing (100% vs 77%, P = 0.008).

However, clinicians performed relatively poorly when responding to other questions: 59% (22/37) thought that avoiding international travel to areas already affected by influenza A(H1N1)pdm09 would be protective; 46% (17/37) thought that the virus mainly affected the young and the elderly; 33% (12/37) believed that antiviral drugs could cure illness caused by influenza A(H1N1)pdm09; and 27% (10/37) thought that wearing a face mask in public would prevent spread of the disease.

Discussion

This study shows that during the containment phase of the response to influenza A(H1N1)pdm09, staff of the West Midlands FRC had a positive attitude towards working in the FRC. Additionally, staff believed that the FRC had made a positive contribution to the management of influenza A(H1N1)pdm09 during the containment phase, and would work in similar call centres in future. These findings are consistent with a previous survey of clinical personnel in Taiwan staffing a telephone hotline for severe acute respiratory syndrome.10

Overall, the knowledge of FRC staff about influenza A(H1N1)pdm09 and the containment phase was generally good, and although there was no significant difference between the median overall knowledge scores for clinical and non-clinical staff, areas of potential concern were identified, particularly regarding the knowledge of clinicians. Clinicians clearly identified staying at home and frequent handwashing as

### Table 1 – Characteristics of respondents.

| Demographics           | n | % (95% CI) |
|-----------------------|---|------------|
| Gender                |   |            |
| Male                  | 29| 41.4 (29.8–53.8) |
| Female                | 41| 58.6 (46.2–70.2) |
| Ethnicity             |   |            |
| White                 | 41| 64.1 (51.1–75.7) |
| Non-White             | 23| 35.9 (24.3–48.9) |
| Professional status   |   |            |
| Doctors               | 12| 17.9 (9.6–29.2) |
| Nurses                | 25| 37.3 (25.8–50.0) |
| Specialist registrar/trainee | 13| 19.4 (10.8–30.9) |
| Otherb                | 17| 25.4 (15.5–37.5) |
| Age group (years)     |   |            |
| <24                   | 70|            |
| 25–34                 | 23| 32.9 (22.1–45.1) |
| 35–44                 | 23| 32.9 (22.1–45.1) |
| 45–54                 | 17| 24.3 (14.8–36.0) |
| ≥55                   | 3 | 4.3 (0.9–12.0)  |
| Organization          |   |            |
| Health Protection Agency | 25| 35.7 (24.6–48.1) |
| National NHS organizationsc | 29| 41.4 (29.8–53.8) |
| Agency/bank workerd   | 16| 22.9 (13.7–34.5) |
| Previous call centre experience (years) | 79|      |
| 0                     | 53| 67.1 (55.6–77.3) |
| <1                    | 12| 15.2 (8.1–25.0)  |
| 1–5                   | 10| 12.7 (6.2–22.1)  |
| >5                    | 4 | 5.1 (1.4–12.5)   |

NHS, National Health Service; CI, confidence interval.

a Total respondents may vary woth some questions.

b Includes scientists, information officers, information technology officers, administrators and call handlers.

c Includes Strategic Health Authority, Primary Care Trust and other NHS organizations.

d Temporary staff that may have been clinical or non-clinical.

Experience of working arrangements in the FRC

Overall, experience of working in the FRC was rated as very good/good by approximately two-thirds of respondents (66% vs 34%, P < 0.0001) (Table 2). The highest ranked factors contributing to this were availability of information technology support, clarity of the person’s main role within the FRC, and availability of clinical support. Although a significantly greater proportion of respondents would consider working in a call centre similar to the FRC in future compared with those who would not or were not sure (61% vs 39%), less than half of the respondents (48%) would recommend working in this type of call centre to colleagues.

Compared with those who strongly-disagreed/disagreed, a significant proportion of respondents (66% vs 34%, n = 73) strongly-agreed/agreed that the FRC had made a positive contribution to the management of influenza A(H1N1)pdm09 during the containment phase.

Knowledge of influenza A(H1N1)pdm09 and precautionary behaviour

Nearly all respondents indicated that they were familiar with the terms ‘pandemic flu’ or ‘influenza pandemic’ (99%, 72/73). A significant proportion of respondents (91%)
Experience ratings of respondents of the West Midlands Flu Response Centre (FRC). Respondents’ knowledge of influenza A(H1N1)pdm09 and the containment phase.

Table 2 – Experience ratings of respondents of the West Midlands Flu Response Centre (FRC).<sup>a,b,c</sup>

| Experience rating                                      | Very good/good n (%) | Very poor/poor n (%) | P-value |
|-------------------------------------------------------|----------------------|----------------------|---------|
| Clarity of your main role within the FRC              | 60 (80.2, 71.5–90.2) | 13 (17.8, 9.8–28.5)  | <0.0001 |
| Clarity of individual roles within the FRC            | 48 (70.6, 58.3–81.0) | 20 (29.4, 19.0–41.7) | <0.0001 |
| General pandemic influenza A/H1N1 training provided by the FRC | 38 (58.5, 45.6–70.6) | 27 (41.5, 29.4–54.4) | 0.079   |
| Effectiveness of training provided on FluZone         | 46 (67.7, 55.2–78.5) | 22 (32.4, 21.5–44.8) | <0.0001 |
| Usefulness of FluZone as a resource                  | 55 (78.6, 67.1–87.5) | 15 (21.4, 12.5–32.9) | <0.0001 |
| Quality of briefings in the FRC                      | 39 (60.0, 47.1–72.0) | 26 (40.0, 28.0–52.9) | 0.035   |
| Administrative arrangements in the FRC               | 46 (64.8, 52.5–75.8) | 25 (35.2, 24.2–47.5) | 0.001   |
| Operational management of the FRC                    | 51 (71.8, 60.0–81.9) | 20 (28.2, 18.1–40.1) | <0.0001 |
| Clarity on whom to consult/seek advice from when dealing with problems arising in the FRC | 46 (65.7, 53.4–76.7) | 24 (34.3, 23.4–46.6) | <0.0001 |
| Effectiveness of problem solving                     | 47 (69.1, 56.7–79.8) | 21 (30.9, 20.2–43.3) | <0.0001 |
| IT support available in the FRC                      | 62 (88.6, 78.7–94.9) | 8 (11.4, 5.1–21.3)   | <0.0001 |
| Clinical support available in the FRC                | 57 (82.6, 71.6–90.7) | 12 (17.4, 9.3–28.4)  | <0.0001 |
| Daily staffing levels in the FRC                     | 53 (81.5, 70.0–90.1) | 12 (18.5, 9.9–30.0)  | <0.0001 |
| Overall skill mix within the FRC                     | 52 (78.8, 67.0–87.9) | 14 (21.2, 12.1–33.0) | <0.0001 |
| Communication within the FRC                         | 41 (57.8, 45.4–69.4) | 30 (42.3, 30.6–54.6) | 0.093   |
| Your overall experience of the centre                 | 48 (65.8, 53.7–76.5) | 25 (34.3, 23.5–46.3) | <0.0001 |

IT, information technology; CI, confidence interval.

<sup>a</sup> Experience was rated by respondents using a five-point Likert scale (1, very good; 2, good; 3, poor; 4, very poor; 5, not applicable).

<sup>b</sup> Non-applicable responses are not shown in the table.

<sup>c</sup> Total respondents may vary with some questions.

preventive measures. However, more than half would have advised not travelling abroad in order to avoid infection, approximately half did not know the main age group affected during the containment phase, nearly one-third thought that antiviral drugs could cure infection, and just over one-quarter thought that wearing face masks in public places was protective. There is no evidence supporting the effectiveness of these measures. Potential explanations for these misconceptions cannot be addressed by this survey, and it is possible that they may have resulted in the provision of incorrect information to callers. These findings support previous research suggesting that during a public health emergency, clinicians should be provided with disease-specific education and training prior to working on a helpline.<sup>10</sup>

Table 3 – Respondents’ knowledge of influenza A(H1N1)pdm09 and the containment phase<sup>a</sup> (n = 68).

| Knowledge of influenza A(H1N1)pdm09 | Correct response n (%) | Incorrect response n (%) | P-value |
|------------------------------------|------------------------|--------------------------|---------|
| a. An influenza pandemic is due to a new influenza virus against which all or most people have no natural immunity (T) | 62 (91.2, 81.8–96.7) | 6 (8.8, 3.3–18.2) | <0.0001 |
| b. The aim of containment was to stop local spread of the pandemic virus (T) | 61 (89.7, 80.0–95.6) | 7 (10.3, 4.2–20.1) | <0.0001 |
| c. Antiviral drugs can cure illness due to the pandemic virus (F) | 18 (27.3, 17.0–39.6) | 48 (72.7, 60.4–83.0) | <0.0001 |
| d. The virus is easily spread by coughing (T) | 64 (95.5, 87.5–99.1) | 3 (4.5, 0.9–12.5) | <0.0001 |
| e. In the UK, the illness caused by the current pandemic flu virus is currently mild in most cases (T) | 64 (97.0, 89.5–99.6) | 2 (3.0, 0.4–10.5) | <0.0001 |
| f. Pandemic flu can be treated successfully using antibiotics (F) | 7 (10.6, 4.4–20.6) | 59 (89.4, 79.4–95.6) | <0.0001 |
| g. Frequent washing of hands prevents the virus from spreading (T) | 65 (97.0, 89.6–99.6) | 2 (3.0, 0.4–10.4) | <0.0001 |
| h. The virus can be prevented from spreading by wearing face masks in public (F) | 14 (22.6, 12.9–35.0) | 48 (77.4, 65.0–87.1) | <0.0001 |
| i. The virus can be prevented by not travelling abroad to areas already affected (F) | 28 (44.4, 31.9–57.5) | 35 (55.6, 42.5–68.1) | 0.29   |
| j. The current pandemic flu virus mainly affects the young and the elderly (F) | 23 (35.9, 24.3–48.9) | 41 (64.1, 51.1–75.7) | 0.0035 |
| k. Staying at home when ill can reduce spread of pandemic flu (T) | 68 (100.0, 94.7–100.0) | 0 (0.0, 0.0–5.3) | <0.0001 |

CI, confidence interval.

<sup>a</sup> The correct response is provided in parentheses after the statement/question (F = false, T = true).
One of the greatest challenges encountered when staffing the FRC was identifying and recruiting appropriate staff. The number, grade and profession of the individuals employed in the West Midlands FRC varied considerably, particularly at the peak of response, and few respondents had any previous experience of working in a call centre. The West Midlands FRC dealt with thousands of calls from health professionals and members of the public on a wide range of aspects, and keeping staffing levels aligned with the workload was a challenge, as was ensuring that staff received the required training. The extent to which the high proportion of staff with limited or no prior experience of working in a call centre may have affected the efficiency or effectiveness of the FRC in fulfilling its objectives is unknown. This is an area for potential future research.

E-mail surveys are known to have average response rates of 30–40% for online surveys; therefore, a relatively good response rate was achieved for this survey (51%). However, inferences need to be interpreted cautiously given the relatively small number of respondents and potential bias due to varying levels of non-response to certain questions. Another potential limitation is that the heterogeneous nature of the ‘clinical’ and ‘non-clinical’ groupings may have introduced error. Although the use of an electronic survey precluded detailed qualitative study, the method used allowed large-scale data collection in a timely, practical and cost-effective manner. Additionally, only West Midlands FRC staff were surveyed, service users were not examined, and no comparisons were made between West Midlands FRC staff and FRC staff in other regions.

Conclusions

What has been learnt from this survey that might prove useful in supporting future planning? The practical implications of setting up helplines during a public health emergency are complex, particularly given the potential range of reasons for calling and the pressures of rapidly escalating call numbers and public concern. Surge capacity has been identified previously as an issue during pandemic preparedness, and securing sufficient and appropriate staff at short notice has been identified as challenging in this study and by others. Time will need to be invested in training, and this study suggests that assumptions should not be made regarding the level of knowledge of clinicians, and that disease-specific training and education should be provided to all staff. Information from this survey can be used to inform future efforts that require the establishment of similar services in response to a major public health incident.

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Competing interests

None declared.

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