What are the factors associated with successful implementation of the NICE guidelines for head injury imaging? A postal questionnaire survey

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Abstract

Background

In June 2003, guidelines were published by NICE regarding immediate care and the CT imaging of Head injured patients. This study evaluates the national implementation of these guidelines, and explores the factors associated with non-implementation

Methods

A postal questionnaire study was mailed to every UK ED in September 2004, and follow up communication made to those non-responding departments by May 2005.

Results

Complete information was obtained from163 of 217 eligible departments (75.1%). Scottish departments were excluded, as they use SIGN. 50/163 (30.7%) of trusts completely implement the guidelines. No single factor was significantly associated with non-implementation, but implementation is more likely in large departments where ED staff interpret scans, and with on-site neurosurgeons.

Conclusions

18 months after publication most departments do not implement the guidelines from NICE. 76.4% of the 13.4 million yearly ED attendances are to non-implementing departments

Background

In June 2003, the National Institute for Health and Clinical Excellence (NICE) issued clinical guidelines on the "appropriate treatment and care of individuals with head injury within the NHS in England and Wales" [1].

Within this, NICE have issued guidance on the use of Computed Tomography (CT) scanning in patients who have sustained a head injury. This advocated an increased rate of CT scanning compared to previous guidelines [2]. The introduction of these and other NICE guidelines was to deliver care in line with best available evidence of clinical and cost effectiveness. However, uptake of the NICE guidelines in general has been shown to be variable, and seems to be more likely where there is strong professional support, a convincing evidence base and no associated increased or unfunded costs [3]. Studies have shown that in the case of the Head Injury guidelines, implementation will involve increased costs [4] [5] [6], although in one savings were demonstrated [7].

Much debate has occurred within Emergency Medicine regarding these guidelines for CT scanning of the head injured patient and their uptake [8] [9]. In addition to identifying the proportion of Emergency Departments (ED's) that were implementing the guidelines, we also wanted to know what factors were associated with successful implementation. This would be useful information to help departments that had struggled to implement the guideline. We also wanted to know what the perceived reasons for non-implementation were.

Methods

In September 2004, a questionnaire with 8 direct questions regarding the implementation of NICE guidelines for CT scanning after head injury was posted to the lead clinician in every UK department that provided 24-hour cover. All ED's in the UK were identified using the BAEM directory [10].

There were also questions designed to assess the reasons for non-implementation. A space was also included for extra comments, as the respondents felt appropriate.

Those departments who did not respond by the end of 2004 (104 / 248) were contacted by one of the authors (DK) between February and May 2005, by telephone or e-mail, and given the opportunity to respond.
In addition, each department was categorised, based on the BAEM "Way ahead 2005" document [11], into small (less than 40,000 annual attendances), medium (40,000 to 70,000 annual attendances) and large (more than 70,000 annual attendances).

Data were analysed with STATA 7 statistical software. Unadjusted odds ratios were used for bivariate analysis. Unconditional logistic regression was used for multivariate analysis. Statistical significance was assumed at 5%.

Results

248 major receiving ED's were identified in the UK. In Scotland, the majority of hospitals reported that they use SIGN criteria [12] to guide management of head injured patients, therefore responses from Scotland were excluded, leaving 217 hospitals in England, Wales and Northern Ireland for analysis.

Complete data to the essential questions was obtained from lead clinicians in 163 of these departments (response rate 75.1%). Non-responders were more likely to be from small or large departments
Of the 163 departments that responded, 51 reported that they fully implemented all the guidelines (31.3%). The rate of implementation is highest in large and lowest in small departments.
ED staff in 27 departments performed initial interpretation of scans. This was associated with implementation of the guideline, but was not statistically significant. Departments with on site neurosurgeons were more likely to implement, though this was not statistically significant.
53.5% of departments report that they perform skull radiographs in head injured patients. Not doing skull radiographs was associated with implementation of the guidelines. 4 questionnaires missed data on this item

In those ED's who have an observation ward implementation was more likely, though not statistically significantly.
Implementation was slightly higher in ED's who retained responsibility for patients admitted with head injury, although this was not significant.

The multivariate analysis shows that there was, as expected, some interaction between the predictors. In particular, larger hospitals were more likely to have on-site neurosurgeons.

Of the 113 departments that indicated that they did not implement the NICE head guideline on CT provision, 76 (67.2%) had complete data as to the reasons why. These are illustrated as a chart in figure 1.
35 of the postal respondents replied with comments in the free text.
Many Scottish hospitals were keen to point out that they follow the SIGN guidelines, and were generally happy with this, and as a result we excluded all Scottish hospitals from our final results. Several respondents cited that the guidelines were not implemented following decision at Trust Board level.
Five replies included comments in the text which drew attention to the fact that the guidelines were difficult to interpret or inappropriate for children, especially with regard to vomiting. This reflects the weaker evidence base in this aspect of the guidelines [13].
Generally, respondents commented that the guidelines from NICE are based on mixed levels of evidence and implementation requires local adaptation.

Discussion

Only 31% of ED's appear to be implementing the NICE guideline on CT scanning head injured patients 18 months after publication of the guideline. (June 2003). Out of 13.4 million attendances to departments in England, Wales and Northern Ireland [10], 10.2 million (76.4%) were to departments that do not implement the Head Injury Imaging recommendations from NICE.

We acknowledge that the postal survey is a weak study design; however our results are consistent with our own regional experience.

No reason was statistically significantly associated with implementation. However, implementation was more likely though not statistically significant in large ED's, in those where ED staff performed initial interpretation of the scans, in departments where head injured patients are admitted under the ED team, and in those hospitals with on-site neurosurgical facilities. This is perhaps understandable if the patients are to be admitted under the care of the Emergency Department team, who will wish to have clear scan evidence of the absence of neurosurgically correctable lesions. Likewise, in Trusts that have neurosurgeons on site, the neurosurgical team would also wish to have immediate scan evidence of treatable pathology. In large departments who see a high number of head injured patients, the use of CT scan to risk stratify the patients would be important.

We were concerned to find that the majority of ED's are still relying on skull x-rays to triage head injured patients, though this is understandable if obtaining a head CT is difficult. The SIGN guidelines however, have a role for skull x-ray, subsequently scanning all those found to have a fracture. There is concern that unlike SIGN, clinicians following NICE guidelines may wait for a clinical deterioration before making the decision to scan [14].

There appears to be broad support among senior emergency physicians for the NICE guidelines. Most ED clinical directors agree with statements suggesting that non-implementation of the guidelines is due to difficulty in accessing radiology. This seems to be independent of cost to either ED or radiology departments. In a document published in 2002 the Royal college of Radiologists calculated that Radiology workload had increased by up to 5% in the past 10 years, notwithstanding the introduction of recommendations such as NICE [15]. The college also estimated a mismatch between numbers of examinations undertaken and whole-time equivalent clinical radiologists of more than 800 consultants. It is possible that with increased training of radiographers and ED staff, interpretation of scans could be achieved without the presence of a Radiologist. Our study has identified that implementation of the guidelines was higher in trusts where initial interpretation of scans was performed by ED staff.

After radiology access, the most frequently cited problem with implementation was personal disagreement with the guidelines. From the free text comments, many

respondents felt that in many areas the evidence base was weak, and that the use of available evidence by NICE was confusing or unclear. Interpretation of the guidelines was therefore difficult in certain circumstances, especially with regard to children.

It has been shown previously that clinical examination and documentation need to be improved in order to elucidate features that would necessitate a CT scan before any guidelines regarding scanning would be effective [16][17]. It is not clear whether implementing the NICE guidelines has changed outcome in head injured patients. Further study is required to consider this important question.

Conclusions

At the end of 2004, some18 months after the NICE guidelines were published, the majority of ED's in England, Wales and Northern Ireland cannot fully offer NICE recommended guidelines. Successful implementation seems to be associated with ED staff interpreting scans, maintaining inpatient responsibility for head injured patients, the use of an observation ward, the presence of neurosurgeons on site and a large annual patient attendance.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

DK designed and mailed the questionnaire, input the data and drafted the manuscript. AB participated in the design of the study and performed the statistical analysis. ET was involved in the design of the questionnaire and the interpretation of data. CM participated in the design of the study and assisted in the drafting of the manuscript. All authors read and approved the final manuscript

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Figures

Figure 1

Reasons for non-compliance with the NICE CT Head Injury Guideline in 113 Emergency Departments

Tables

Table 1. Size of departments and questionnaire non-response rate

	Non-responder	Responder	Total	% non-responders
Small	9	21	30	30.0%
Medium	27	103	130	20.8%
Large	18	39	57	31.6%
Total	**54**	**163**	**217**	**24.9%**

Chi^2 (2df) = 7.55 p = 0.02

Table 2. Unadjusted odds ratios of factors associated with implementation of the NICE guidelines for head injured patients.

Factors associated with implementation of the NICE guideline	**Unadjusted odds ratio of implementation (95% Confidence Intervals)**	**P value**
Small department (<40000 attendances)	1.0 (REF)	REF
Medium department (40-70000 attendances)	1.4 (0.5-4.1) (1)	0.56
Large department (>70000 attendances)	1.9 (0.6-6.5) (1)	0.28
Emergency department staff responsible for interpreting CT scans	2.0 (0.9-4.6)	0.11
Neurosurgeons on the same site as the emergency department	1.8 (0.7-4.6)	0.22
Skull x-rays being performed	0.2 (0.1-0.4)	< 0.01
Observation ward attached to the emergency department	1.9 (0.9-3.7)	0.06
Emergency department staff responsible for head injury patients when admitted to hospital	1.5 (0.8-2.8)	0.18

(1). Score test for trend of odds: P value = 0.25

Table 3. Logistic regression model of factors associated with implementation of the NICE guidelines for head injured patients.

	Odds ratio of implementing the NICE guidelines for Head Injury (95% confidence interval)	**P value**
Small department (<40000attendances)	1.0 (REF)	N/A
Medium department (40-70000 attendances)	1.4 (0.4-4.6)	0.69
Large department (>70000 attendances)	1.7 (0.4-7.2)	0.44
Emergency Department staff responsible for interpreting CT scans	1.6 (0.6-4.0)	0.36
Neurosurgeons on the same site as the emergency department	1.2 (0.4-3.7)	0.72
Skull X-rays being performed	0.2 (0.1-0.4)	<0.01
Observation ward attached to the emergency department	1.7 (0.6-5.0)	0.33
Emergency department staff responsible for head injury patients when admitted to hospital	0.9 (0.3-2.3)	0.79