The use and abuse of the emergency ambulance service: some of the factors affecting the decision whether to call an emergency ambulance

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SUMMARY

Over a 1-month period all patients arriving in the accident and emergency department by ambulance following a '999' call were questioned using a standard proforma. They were assessed as to whether their medical condition warranted ambulance transfer. A number of social and practical points were analyzed to see whether they would identify any group of patients who used the emergency service without medical need. Overall 289 patients were questioned. Of these 178 (62%) were considered to have medically warranted an ambulance call whereas 111 (38%) did not. A number of features which were more likely to result in an unjustified call were identified. These would suggest that basic knowledge of first aid by the public is poor and should be improved.

INTRODUCTION

One previous paper has investigated the incidence of unnecessary ambulance use in this country (Morris & Cross, 1978). In that paper a total of 51.7% of calls were deemed unjustified and a further 10.2% were of doubtful necessity. A similar paper from Dublin (which excluded children under the age of 14) has produced results showing a 44% unjustified rate (O'Leary, *et al.*, 1988). This paper has produced very similar justification rates to Morris & Cross. Morris & Cross have concentrated mainly on the analysis of patient by medical specialty and overall outcome. This paper looked at some of these aspects again but also tried to investigate some of the social and practical points

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surrounding the ambulance call and hence identify a specific group of the population who misused the system. If such a group could be identified then educational and advertising material to reduce this misuse could be more accurately targeted rather than aiming at the population as a whole.

METHOD

Over the course of one month all patients attending the accident and emergency department following a '999' call were questioned using a standard proforma (Appendix 1). Also included were patients who had had an emergency ambulance ordered by their general practitioner after a home visit. Patients accepted by in-patient firms or transferred direct to the ward were not included. The forms were completed by the doctor attending the patient. In 60 cases this was by myself and in most of the remainder by the A&E Senior House Officers (SHOs) although, in the more serious cases, the other registrar or the consultant would have been involved in the patient management. The attending doctor was asked to assess whether, in his or her opinion, a '999' call was justified if the degree of medical urgency was the only criterion. It was not felt possible to issue comprehensive guidelines as the number of situations to cover would have been too great. However, certain cases were normally accepted as 'justified': any life-threatening or potentially life-threatening illness (for example, angina); any condition which was expected to produce severe pain; any condition which produced immobility or required treatment before transfer; and most road traffic accidents (because of possibility of spinal injury).

RESULTS

A total of 289 patients were questioned. Of these 178 (62%) had made justifiable calls whereas 111 (38%) had not. A total of 180 patients had suffered from trauma and 109 had a medical illness. Of the 180 trauma patients 91 fell into the justified category and 89 into the unjustified group. Of the 109 patients with medical problems 87 were classified as justified and only 22 as unjustified.

Age distribution

Figure 1 shows the age distribution for calls divided into overall, justified and unjustified groupings. Analysis of these groups indicates no significant difference between them (Pearson $\chi^2 = 9.94$ 9df $P = 0.3$).

Place of incident

Analysis of these data shows there is no significant difference between the two main groups for any of the different places of incident. (Table 1. $\chi^2 = 10.11$ 6df $P > 0.1$).

Fig. 1 Age distribution of patients.

Table 1 Place of accident

	Justified		Unjustified	
	Actual	Expected	Actual	Expected
Work	13	10.5	4	6.5
School	2	4.3	5	2.7
Home	69	63.4	34	39.6
Shop	9	7.4	3	4.6
Street	51	54.8	38	34.2
Other	10	13.6	12	8.4
Unknown	24	24	15	15

Pearson $\chi^2 = 10.11$ 6df $P = 0.12$.

Initiator of call

There is a significant difference between the two main groups when considering this category (Table 2 $\chi^2 = 19.00$ 10df $P < 0.05$). Further analysis shows that this is mainly accounted for by the 'relative', and 'other' groups. In the 'relative' group there is a higher number of justified calls than expected. Breakdown of the 'other' group further shows that the main difference is accounted for by friends calling the ambulance. In this case there were more non-justified calls than expected.

Minor contributions to the significance were made by other initiators within this category. When the calls were initiated by the patient, teacher, or passer-by then the call was more likely to be unjustified. When initiated by an employer, shop staff, or GP they were more likely to be justified.

Table 2 Initiator of emergency call

	Justified		Unjustified	
	Actual	Expected	Actual	Expected
Patient	7	8.6	7	5.4
Employer	10	8	3	5
Teacher	0	2.5	4	1.5
Relative	45	40	20	25
Shop Staff	10	8.6	4	5.4
Passer-by	17	19.7	15	12.3
Works nurse	3	1.8	0	1.2
GP	7	6.2	3	3.8
Police/Fire	5	5.5	4	3.5
Other	21	28.3	25	17.7
Unknown	53	48.7	26	30.3

Pearson $\chi^2 = 19.90$ 10df $P = 0.03$.

Opinion of injury

There was a significant difference in this category between the two groups (Table 3 χ^2 3df $P < 0.05$). It can be seen that the category 'life-threatening' contained more people in the justified group than expected. A more minor contribution to significant difference was made by the fourth category of 'severe pain'. Again more people were in the justified group than expected. Another small contribution to result was made by the 'worried by blood loss' category. This had more unjustified calls confirming the view that patients often estimate blood loss badly.

Table 3 Patients opinion of injury

	Justified		Unjustified	
	Actual	Expected	Actual	Expected
Life threatening	25	17.8	5	12.2
Worried by blood loss/ loss of limb	5	7.7	8	5.3
Severe pain	35	39.7	32	27.3
Other	60	59.8	41	41.2

Pearson $\chi^2 = 10.90$ 3df $P = 0.01$.

Disagreeing with call or £2 charge

As might be expected only small numbers of patients disagreed with the ambulance being called when it was called by another person (total 21/289). The main people who did object were epileptics, who would have preferred to have recovered at the scene, and

a number of drunks. Only 25 would have objected to a £2 charge being made. Again some of these were epileptics or people from the previous category.

Requiring no treatment

A total of 64 (22%) patients required no treatment at all following their attendance at A&E. Nevertheless, 29 of these were considered to have had a condition warranting an ambulance call, for example epilepsy or angina, but had recovered spontaneously. A total of 35 (12%) did not warrant an ambulance for their condition.

Delay between injury and 999 call

In a number of cases this was unknown and statistical analysis cannot be applied. However, the data available show that most calls in both groups were placed between 0 and 15 minutes following the incident. However, in 25 cases the delay was in excess of 30 min (45 min–15 h).

Responses to remaining questions

A number of replies were missing and statistical significance cannot be assigned to these results. However, examination of the data does show some interesting points: Only 35 patients had sought medical advice either from their GP or the A&E department prior to calling the ambulance; it would seem that having had a similar illness or injury in the past made it more likely that the ambulance call was justified; and having another adult present would also seem to improve the likelihood of a call being justified.

Distance from hospital

Analysis of the incidence of calls against distance from hospital showed peaks corresponding with the local population centres. It is difficult to decide whether the distance from hospital is a decisive factor as it will be interrelated to a number of other factors such as the GP availability, use of a car, use of a telephone and so on.

DISCUSSION

In 1978 Morris & Cross investigated the problem of inappropriate ambulance calls in a major city area. The area under study in this paper is a small city with little urban sprawl and a large surrounding rural area. In addition there are a number of separate large major industrial complexes with their associated residential areas.

Morris & Cross showed that 61.9% of these calls were unnecessary or of doubtful validity. This corresponds closely with the findings in this study in which 61.5% of calls were deemed invalid. However, unlike their study this paper sought to categorize patients purely on medical need without allowing for age or social conditions of the patient. If these other factors had been taken into consideration then it would be expected that the inappropriate call-out rate would have been reduced.

Table 4 shows how the figures in this paper compare with those by Morris & Cross and O'Leary *et al.* Although O'Leary saw fewer trauma patients the overall justification rates are very similar to this paper. Morris & Cross saw similar amounts of trauma but had lower justification rates in both medical and trauma categories. The higher justification rates for medical call-outs shows that an ambulance call to a medical emergency was much more likely to be justified than that to a trauma case.

The other results show a number of features which relate to the decision to call the ambulance. Some of these improve the quality of the call while a number seem to be related to unwarranted calls:

The peaks of calls in the 15–25 age group is not unexpected and can be explained mainly on the basis of assaults and road traffic accidents. O'Leary *et al.* found that age had an influencing factor on the justification of an ambulance call. They found 86% of patients over 70 years justified whereas only 47% of those under 25 were justified. This paper fails to support this finding and there was no difference between the justified and unjustified calls over the age range. This apparent disparity may be due to the different methods of assessment used in the two papers. In particular, admission was given a heavy weighting in the Dublin paper. Clearly a number of elderly patients will be admitted via A&E even though they have only minor trauma. This is often for 'social' reasons. These cases for admission are obviously acceptable but they would not be included in the justified group for ambulance usage in this paper.

The results suggest that the initiator of call may be important. The reasons for shop staff or employers being more able to determine seriousness than others may be a reluctance to call an ambulance until someone is obviously ill in order to minimize disruption to the workplace or store. Alternatively, it may be because of basic first aid training which is obligatory in businesses employing over a certain number of people leading to better decisions. However, even the Health and Safety Regulations are not extensive and only require there to be a trained first aider in most businesses employing more than 50 people. That a relative is more able to judge severity than the patient may be because they are able to view things more objectively and, in some cases, may have been nursing the patient for some time, especially if the patient is elderly. Teachers are most likely to order unnecessary ambulances in an attempt to 'cover themselves' and also may well have no teachers free to bring a child to A&E. Friends and passers-by are not good judges. This may be for a number of reasons including panicking, not wanting to get involved, and a lack of basic medical knowledge or first aid. Undoubtedly there will be other reasons but the lack of first aid knowledge would seem to be one remedial cause.

Table 4 Comparison of published papers

	Trauma/surgical % of total	Medical % of total	Justified Trauma %	Justified Medical %
Gardner	62.3	37.7	51	80
O'Leary <i>et al.</i> (1987)	45.7	44.7	54	85
Morris & Cross (1980)	57.6	36.1	37	57

It is surprising that the place of the incident seemed to make no significant difference to the validity of the call. It might have been expected that those accidents occurring outside the home or other supportive environment might have resulted in unjustified calls. Analysis of Table 1 shows that more calls than expected were unjustified if the place of accident was school. This would support the previous significant finding that a teacher initiating the call was more likely to be unjustified. Conversely, accidents occurring at work or in a shop resulted in more justified calls than expected which supports the finding that shop staff or employers who initiated the call were more often justified than not.

The results showed that more patients were justified when they felt their condition was 'life-threatening' or where they were in 'severe pain'. Although all the patients in the first group did not, in fact, have life-threatening conditions this choice of category would suggest that these patients had an idea of the seriousness of their complaint. The better results for the second group is somewhat surprising as it often appears that patients with only minor injuries complain of severe pain. However, the figures suggest that pain is an acceptable feature in deciding ambulance usage.

CONCLUSION

This paper shows that misuse of the ambulance system continues. This is a waste of an increasingly hard-pressed resource. Several methods have been suggested to improve the utilization of this service. In France the *Service d'Aide Medicale Urgente* (SAMU) employs a doctor (*le Regulateur*) in the ambulance despatch room to determine which level of response is required, from GP to hospital-based flying squad. In America it has been suggested that a transport ambulance, staffed by emergency medical technicians, is sent to the scene initially thus sparing the more highly trained paramedics (Ehrlich, 1984). However, it is not stated who would make the decision which to send. Both these systems use a service with varying grade of response. The separation of an emergency ambulance service from a routine ambulance service is, in practice, beginning to evolve in this country. Ambulancemen are undertaking extended and advanced training in increasing numbers. It may then be possible to grade response as happens elsewhere. Clearly, for this to happen there will be a need for faster response times to compensate for the delay while an assessment of need is made. Also there would need to be closer links between the ambulance service and the receiving hospital. This has recently been recommended by the Royal College of Surgeons (1988).

Besides changes in the organization of the ambulance service an alteration in the public's management of trauma is necessary. At this time much attention is rightly given to the teaching of bystanders to resuscitate. This is clearly likely to save lives. However, in this paper most of the patients attending A&E by ambulance were surgical or trauma cases and in these groups there were poor decisions to call an ambulance in 50% of cases. What is needed is an increased teaching and awareness of the severity and first aid treatment of minor trauma. A number of voluntary organizations already run first aid courses and should be encouraged. Within schools there is an increasing willingness to include subjects of relevance to everyday life and a recognized first aid

course should be included so that all school-leavers have some basic skills. Unfortunately, the Department of Education and Science issues no guidelines or recommendations suggesting this at present but should be persuaded to do so in the future. These simple measures would help to avoid panic and allow a more reasoned approach to the injured person.

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Appendix 1

Date:
Time of arrival
Name:
Address:
Date of birth:
Place of accident (address)
Was this: Work School Home Shop Street Other
Was ambulance called by Patient Employer Teacher Relative Shop staff Passenger
by Works nurse GP Other
Was another responsible adult present at the scene (y/n)
Did patient have access to a car (y/n)
Did patient have access to public transport (y/n)
Did patient have access to a private telephone (y/n)
Had the patient contacted the GP before making call (y/n)
Had patient contacted A & E before making call (y/n)
Had the patient had a similar emergency before—specify
What was the time of the accident
What was the delay between accident and 999 call
Patients opinion of injury: Life threatening Dangerous because of blood loss Fear of loss of limb or extremity Severe pain Other (specify)
If ambulance called by someone other than patient does the patient agree to the call (y/n)
If a charge of £2 was made for ambulance would the call still have been made (y/n)

Medical details:

Investigations:

Final diagnosis:

Treatment:

Admitted (y/n) If Yes Ward No =

Based on medical urgency only, in your opinion, was a 999 call justified (y/n)