

Training and willingness to perform bystander basic life support

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Objectives: To evaluate the perceived ability and willingness of people to perform basic life support (BLS), to relate this to those most at risk of sudden cardiac death, and to identify groups of National Health Service (NHS) staff who could benefit from training in BLS. **Design:** Prospective, survey. **Setting:** The Accident and Emergency (A&E) department based at Glasgow Royal Infirmary. **Subjects:** All patients, accompanying persons and NHS staff who were able, willing and waiting in the A&E department. **Methods:** Subjects were asked to complete a proforma with questions relating to their experience and training in BLS. Their recognition of the importance of defibrillation in the light of current European guidelines for BLS was tested. **Results:** 718 proformas were completed. Fifty-seven percent non-clinical NHS staff had received no training in BLS. More than 50% subjects had relatives with risk factors of Ischaemic Heart Disease yet had no training in BLS. Seventy percent ambulance men and 50% clinical NHS personnel would perform mouth to mouth ventilation before calling an ambulance where they were required to perform BLS, as a bystander. Seventy percent non-clinical NHS personnel and non NHS subjects would call an ambulance first. **Conclusions:** Non-clinical NHS personnel form a hospital based group that could be trained in BLS, some of whom could assume an instructor role. A proportion of clinical and emergency personnel would not prioritise an early call for a defibrillator over BLS in the out of hospital setting. (*Hong Kong j.emerg.med.* 2003;10:6-12)

Keywords: Cardiopulmonary resuscitation, heart arrest, training

Introduction

Ischaemic heart disease (IHD) remains a major cause of sudden cardiac death in the western world in general and in the West of Scotland in particular.^{1,2} The true incidence of IHD in the industrialised west remains unknown, and although a reduction in IHD mortality has been demonstrated in some areas,³⁻⁶ the scale of the problem remains immense.

Following the discovery that closed chest cardiac massage could maintain blood flow,⁷ the onus of

providing basic life support initially lay with pre-hospital emergency medical services (EMS).^{8,9} However the scale of the problem, the imminent need of Basic Life Support (BLS) and the fact that the most likely place of sudden cardiac death was outside hospital in the home, in the presence of family, friends or other bystanders called for alternative measures.^{8,10-14} The result has been intensified, community based cardiopulmonary resuscitation (CPR) programmes.¹⁵ BLS has been shown to double survival following cardiac arrest if delivered early.¹⁶

Survival from pre-hospital cardiac arrest of cardiac aetiology in Glasgow was virtually non-existent in the 1980's.¹³ Subsequently the Scottish Ambulance Service underwent an extensive reorganisation with training in CPR and in the use of defibrillators,¹⁷ and an improvement in response times to emergency calls

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followed.¹³ However, the rate of bystander CPR in Glasgow remains poor and this is associated with poor survival rates.^{18,19}

This study investigated the perceived ability and willingness of people to perform BLS, to relate this to training and to identify the proportion who have relatives with risk factors of IHD.

Methods

The awareness of BLS within the population using an Accident and Emergency (A&E) department was studied prospectively over 24 hours for 7 consecutive days in November 1994. Glasgow Royal Infirmary (GRI) is a major teaching hospital serving a population of approximately 200,000 in the relatively deprived east end of Glasgow. The hospital has over 900 beds and 3588 staff. (Table 1) This number excludes ambulance personnel since they are not employed by the NHS. The A&E department receives over 74,000 new patients and about 10,000 review patients per annum. Approximately 175 cases of pre-hospital cardiac arrest of cardiac aetiology are brought here annually.¹⁸

Any who were able, willing and waiting were invited to complete a short proforma. A brief document describing the study and emphasising that it related to out-of-hospital collapse was shown to them. Staff, patients, relatives, friends or acquaintances were asked to complete the questionnaire.

Table 1. Staffing in Glasgow Royal Infirmary.

	Number of staff	%
Medical and dental	374	10
PAM's*	493	14
Nursing – trained	1024	28.5
Nursing – auxiliaries	476	13
Administrative and clerical	591	17
Ancillary**	571	16
Maintenance	59	1.5
Total	3588	100

*PAM's – professions allied to medicine

**includes portering, catering and domestic staff (personal communication – Mrs K Small)

The questionnaire enquired about age, sex, occupation, training in or awareness of CPR, perceived ability and willingness to perform BLS, any relatives with risk factors of ischaemic heart disease, and experience of pre-hospital collapse requiring mouth to mouth ventilation or chest compression. Distribution of training is expressed in Figure 1. We were interested to study the current knowledge of European Guidelines on BLS especially where it related to the need for defibrillation i.e. whether a bystander would administer mouth to mouth ventilation first in the scenario of cardiac arrest or call for an ambulance.

Four distinct occupational groups were identifiable. (Figure 1) The 'clinical' NHS cohort included doctors, registered and enrolled nurses, all of whom should routinely be familiar with BLS as part of their general training. The 'non-clinical' NHS group comprised all other categories of NHS employee. An important group liaising closely with NHS staff but not part of the same contractual system was the ambulance service. Because of their regular training in BLS and high exposure to cardiac arrest they were grouped separately. The non-NHS group included all other parties responding to the survey.

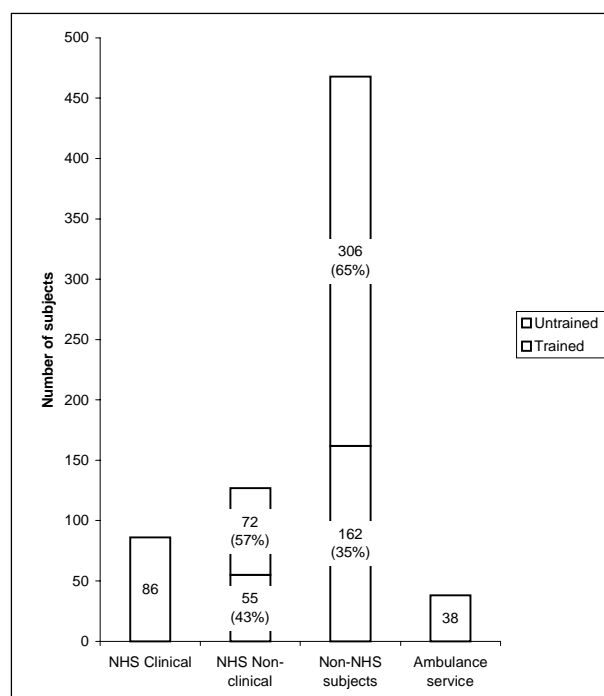


Figure 1. Proportion of subjects trained in BLS.

Most data is descriptive and statistical analysis does not add to the analysis. However, χ^2 tests are used for comparing differences in sex between those trained and untrained in BLS.

Results

718 proformas were completed at an average rate of 4.3 per hour. One hundred and ninety-six (27%) forms were completed by NHS staff, 478 (67%) by non-NHS staff, 38 (5%) by ambulance personnel and there were 6 (1%) of unknown job description.

Distributions of age, sex and job category are presented in Table 2. More men were trained in CPR than women ($p < 0.001$). The group trained in BLS was slightly younger than those who were untrained.

NHS staff

a) Clinical staff

Over 99% of medical, dental and nursing staff were trained in BLS. The exceptions were one auxiliary nurse and one doctor who believed that he had slipped through the system. As all but one auxiliary nurse were trained in BLS, they were included in this group for simplicity.

Table 2. Characteristics of study subjects.

	Trained		Untrained	
Age (yrs)				
Median	33		37	
Range	12 to 79		10 to 89	
Interquartile range	26 to 41		27 to 50	
Sex*				
Male (N=352)	179	51%	165	47%
Female (N=366)	131	36%	228	63%
NHS employees				
Medical/dental/nursing	55	96%	2	4%
PAM's**	5	71%	2	29%
Maintenance	8	67%	4	33%
Administration/clerical	18	34%	35	66%
Domestic/ancillary	3	12%	22	88%
Other	20	51%	19	49%
TOTAL	109		84	
Non-NHS subjects				
Police	22	100%	0	0%
Social workers/home helps	8	50%	8	50%
Maintenance	26	46%	31	54%
Students/teachers	17	46%	20	54%
Unemployed/retired	18	38%	30	62%
Administrators/clerical	19	38%	31	62%
Sales personnel	8	30%	19	70%
Catering/domestic/porters	6	23%	20	77%
Public transport drivers	1	8%	11	92%
Others	8	36%	14	64%
TOTAL	133		184	

*Sex difference: the males comprise a significantly higher number of trained individuals when compared with women ($p < 0.001$)

**PAM's – Professions allied to medicine

b) Non-clinical staff

Fifty-seven percent of non-clinical NHS personnel had received no training in BLS. These include: administrative and clerical workers, domestic, ancillary, portering and catering staff which together comprise 32% of NHS personnel and professions allied to medicine (PAM's) comprise another 14%. These included radiographers, occupational therapists and physiotherapists.

Relations with risk factors of IHD

The proportion of people from all four groups with relatives who had risk factors of IHD are illustrated in Figure 2. Less than 50% of all respondents with relatives with risk factors of IHD were trained in CPR. These proportions were broadly reproduced in the 80 replies from the non-clinical NHS group. Ten (12.5%) of these had relatives with three coincident major risk factors – myocardial infarction, angina and hypertension.

Early activation of the EMS

Although only a third of non-NHS people were trained in BLS, about 50% believed that they 'knew' how to perform the techniques. When asked which they would do *first* in an out of hospital collapse – mouth to mouth breathing or call an ambulance –

over 50% of clinical staff, and 70% of non-clinical personnel would not call an ambulance, but would initiate mouth to mouth breathing. (Figure 3)

Willingness to perform BLS

Whilst the majority of personnel would perform CPR there was increasing uncertainty about performing mouth to mouth ventilation with strangers. (Table 3) This was heightened in the untrained group who would also be increasingly reluctant to perform chest compressions. Only 103 (14.4%) gave reasons for why they would not do BLS. Sixty-eight (66%) were reluctant to perform mouth to mouth ventilation because of fear of contracting infections such as hepatitis B or HIV. Fourteen (13.6%) said that they would not know what to do, whilst 8 (7.8%) were afraid of doing harm. Dislike of vomit (7), halitosis (3) and alcohol (2) accounted for the remainder. A low proportion of subjects had witnessed an out-of-hospital collapse with only 13% having had any training in CPR.

Estimated number of untrained staff in Glasgow Royal Infirmary

Table 4 provides an estimate of the number of untrained staff in GRI. If we extrapolate from our data base the hospital population then 1115 (31.34%)

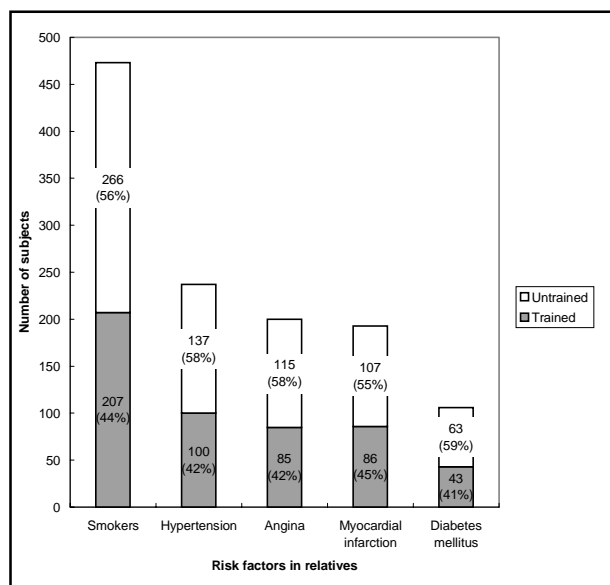


Figure 2. Presence or absence of training for the whole group in those subjects with relatives at risk of ischaemic heart disease.

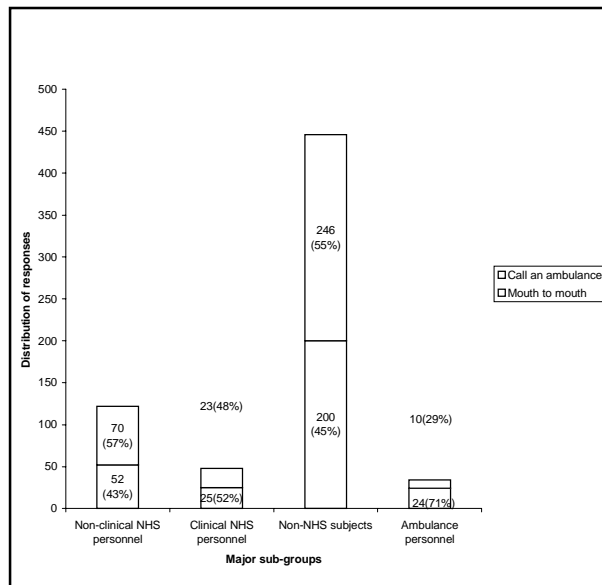


Figure 3. First action in prehospital cardiac arrest – mouth to mouth or call an ambulance.

Table 3. Willingness to perform CPR on relatives, friends and strangers.

	Trained			Untrained		
	Yes	No	Unsure	Yes	No	Unsure
Would you perform MM to relative/friend? (N=697)	301	2	5	341	17	31
Would you perform MM to stranger? (N=667)	182	41	80	173	48	143
Would you perform CC to a relative/friend? (N=689)	296	4	7	302	22	58
Would you perform CC to stranger? (N=664)	276	11	17	248	28	84

MM: mouth-to-mouth breathing; CC: chest compression

Table 4. Estimated number of untrained staff in GRI.

	Number of staff	Estimated number of untrained staff		Estimated number of trained staff	
Medical and dental	374	15	<1%	359	10%
PAM's*	493	143	4%	350	10%
Trained nurses	1024	0	0%	1024	29%
Auxiliary nurses	476	52	1%	424	12%
Administrative and clerical	591	390	11%	201	6%
Ancillary**	571	503	14%	68	2%
Maintenance	59	12	<1%	47	<1%
TOTAL	3588	1115	31%	2473	69%

*PAM's – professions allied to medicine

**includes portering, catering and domestic staff

members of staff were currently untrained in BLS. Such an assessment may not be entirely valid as the population passing through the department may not be totally representative of the hospital as a whole. However it provides a quantitative indication of a large group that could be reached with BLS training.

Discussion

Early recognition of cardiac arrest and CPR, frequently by a bystander, remains one of the key features in successful outcome following pre-hospital cardiac arrest.^{20,21} A number of different groups presenting to an A&E department were studied to assess the proportion that were trained in CPR, their potential contribution in relatives with IHD, and their perceived willingness to perform CPR.

Mass training and targeting specific groups

Despite the efforts of the British Heart Foundation, and Save a Life campaign – initiated in October 1986 –

to stimulate mass training in emergency first aid,²² our study demonstrated that there was still a shortfall in training in CPR. Only 35% of non-NHS respondents attending the A&E department were trained in BLS. This might be a biased population as it reflected only those who encountered A&E. Further it might be that those who were not comfortable with BLS might have avoided completing the form.

Less than 50% of those with relatives possessing risk factors of IHD were trained in CPR, and less than 42% of those with relatives with a history of myocardial infarction or angina were trained in CPR. One might expect that the emphasis upon education in CPR techniques would at least extend towards those with relatives of definite IHD, but no such focus was evident from the survey.

Many suggestions have been made regarding targeting specific groups, including those taking driving tests, students, families of those with IHD, 'telephone' CPR, and general media awareness campaigns.²³ One group

suggested as worth targeting is that employed by the NHS. Over 60% of NHS workers in GRI are neither doctors nor registered/enrolled nurses. Fifty-seven percent of the non-clinical NHS cohort had received no training at any time in BLS techniques. 12.5% had relatives with three major risk factors – myocardial infarction, angina and hypertension.

In our study nearly all auxiliary nurses and professional staff allied to medicine were trained in BLS. For analysis and simplicity, therefore, auxiliary nurses were included with registered and enrolled nurses. If this is the case, and our cohort is representative of the whole hospital, then 1115 (31%) of NHS staff are untrained in CPR. Just prior to our study auxiliary nurses and radiographers within A&E received training in BLS. Therefore, it is possible that we overestimate non-clinical NHS staff untrained in CPR.

The priority of defibrillation

It has been established in other studies that efficacy of CPR and long term survival diminishes with poor CPR technique,^{24,25} and that retention of CPR skills is greater in health care professionals compared to lay people^{26,27} presumably because the former use their skills more frequently. We did not evaluate the skills of participants in the study, but did ask one basic question designed to test familiarity with the contemporary guidelines formulated by the European Resuscitation Council.²⁸ When asked which they would do first in the context of a pre-hospital cardiac arrest – give mouth to mouth ventilation or call an ambulance – 50% of trained clinical staff and 70% of ambulancemen would not call for an ambulance first, despite guidelines which state that the call should take priority over mouth to mouth ventilation and chest compression. It may be that ambulance personnel misunderstood the question, confusing their normal working code with a context where they would act in a bystander role. Forty-five percent of non-clinical NHS personnel and non-NHS personnel would choose the correct option.

The police form a group that are fully trained in BLS. Although we have no accurate data it is suggested that they may arrive at the scene before the ambulance

service in approximately 50% cases when both emergency groups respond to a call. Would the community benefit from a police force trained, equipped and motivated to use automated advisory defibrillators?

Willingness to perform CPR

The majority of people were willing to administer CPR. It is likely that these would be willing to undergo a short training programme in BLS if they had not already done so. Training could significantly improve the confidence and willingness of people to administer CPR in pre-hospital collapses. Fewer would be prepared to do BLS if the person were a stranger than a relative or friend. Others have noted that willingness to perform BLS and participation in reality are not necessarily the same thing, but that training undoubtedly improved the effectiveness of help given.²² Some in our study were reluctant to perform CPR for fear of contracting dangerous infections. Others were wary of vomit, but some would be reluctant for fear of doing more harm than good. Van Hoeyweghen et al demonstrated that whilst quality and efficiency in CPR made a significant difference in survival outcomes, poor quality CPR was certainly no worse than doing nothing.²⁵

We found that far more trained personnel had witnessed a pre-hospital collapse than had untrained. The definition of 'witnessed' may be in question here but there is a suggestion that if someone is aware that a person is trained in BLS that person may be called to help earlier than might otherwise happen.

Conclusions

This evaluation demonstrated that we still fall far short in reaching the goal of mass training in CPR in the catchment area of one major teaching hospital. Previous studies suggest that improvements in survival following cardiac arrest may be gained from such efforts. One group worthy of targeting comprises non-clinical NHS employees, many of whom have relatives with risk factors of IHD. They could even undertake instructor training programmes to teach others in their

own community, possibly with periodic refresher courses.

After several years of effort GRI has recently been successful in employing a resuscitation training officer. Training in BLS has also been offered to the relatives of patients admitted to the coronary care unit. However there is still a shortfall in the training of non-clinical NHS and non-NHS personnel. There remains some concern that trained medical, nursing and ambulance personnel may not appreciate the value of calling an ambulance early.

Acknowledgement

I thank Mr I Swann for allowing the study to take place in his department and Miss K Dalziel for statistical and analytical advice.

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