EDUCATION

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Are undergraduate paramedic students able to accurately estimate a patient's age? – A Short Report

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Abstract

Background

Accurately estimating a patient's age (adult or paediatric) is a requirement for all health care clinicians, especially when the patient is unresponsive. Likewise, this ability is critical for paramedics as calculations for paediatric medication dosages, defibrillation, some equipment sizing, and other invasive procedures like intubation, require age as the basis for the calculation. No previous prehospital or nursing studies on paramedic or nursing age estimations were located. The objective of this study was to identify if undergraduate paramedic students were able to accurately estimate a patient's age.

Methods

A prospective single-blinded observational pilot study requiring students to estimate the age of seven patients of varying age using digital images of a complete person.

Results

The results demonstrate that undergraduate paramedic and paramedic/nursing students have difficulty in accurately estimating a person's age or at least being within five years either side of the actual adult age. Patients one and two were children, 28% of students correctly estimated the age of patient one, with 26% of students correctly estimating the age of patient two. The remainder were adult patients. No student correctly estimated the age of patient three, only 1% of students correctly estimated the age of patient four, 6% of students correctly estimated the age of patient five, none of the students correctly estimated the age of patient six, and approximately 2% of students correctly estimated the age of patient seven.

Conclusions

The results of this pilot study have demonstrated that undergraduate paramedic, paramedic/nursing students, and potentially novice paramedics, lack the ability to accurately estimate the age of a range of patients. The results have provided teaching staff with important information to incorporate into the clinical curriculum.

Background

Accurately estimating a patient's age is a requirement for all health care clinicians, especially when the patient is unresponsive. Likewise, this is an ability required by paramedics, especially for children, as calculations for medication dosages, defibrillation, some equipment sizing, and other invasive procedures, e.g. intubation, use age as the basis for the correct calculation. No prehospital studies on a undergraduate paramedics' or undergraduate nurses' ability to accurately estimate a patient's age were located in a search of the electronic literature. The objective of this study was to identify if undergraduate paramedic students were able to accurately estimate a patient's age.

Methods

This study was a prospective single-blinded observational pilot study that used a convenience sample of students in semester one of 2007. Students included were enrolled full-time in the Bachelor of Emergency Health (BEH) and Bachelor of Emergency Health/Bachelor of Nursing (BEH/BN) degrees offered through Monash University, in Victoria, Australia.

Students were shown seven patients varying in age using a Microsoft PowerPoint™ presentation. Each patient was shown in the presentation for fifteen seconds only. The authors felt this was a reasonable timeframe and consistent with real-life clinical practice, where estimations are judged in a short space of time. This timeframe is also consistent with studies undertaken in the discipline of psychology.¹⁻⁶ Students were shown a frontal and lateral view of a complete person in each slide. A form to collect the student's estimations was supplied prior to commencing the presentation.

Descriptive statistics mean, median, and range were used to summarise the data. Statistical analysis was undertaken using SPSS (Statistical Package for the Social Sciences Version 15.0, SPSS Inc., Chicago, Illinois, U.S.A.). All confidence intervals (CI) are 95%.

Student involvement in the study was voluntary. Ethics approval for the study was granted by the Monash University Standing Committee on Ethics in Research Involving Humans.

Results

One hundred and twenty students participated in the study with 50% of students aged between 20 and 24 years. Seventy percent were females and 30% male. Most students (55%) were enrolled in year two of the BEH with 29% in year three of the BEH, the remaining 16% were enrolled in the BEH/BN.

The results demonstrate that undergraduate paramedic and paramedic/nursing students are not good at estimating the age of a range of patients, with most students unable to correctly estimate the actual age of the adult patients within a range of plus and minus five years of the correct age. However, with the children's ages two-thirds of the students were within one year either side of the correct ages.

Patient 1

Actual Age:4 years
Mean:5.4 years
CI:5.1 years to 5.6 years
Median:5 years
Range:3 years to 10 years
% correct:28
% ± 1 year:62

Patient 2

Actual Age:6 years
Mean:5.7 years
CI:5.4 years to 6.0 years
Median:5 years
Range:3 years to 11 years
% correct:26
% ± 1 year:68

Patient 3

Actual Age:83 years
Mean:76.5 years
CI:75.5 years to 77.5 years
Median:76 years
Range:60 years to 89 years
% correct:0
% ± 5 years:42

Patient 4

Actual Age:44 years
Mean:39.6 years
CI:38.8 years to 40.4 years
Median:39 years
Range:30 years to 53 years
% correct:1
% ± 5 years:47

Patient 5

Actual Age:60 years
Mean:49.8 years
CI:48.7 years to 50.9 years
Median:50 years
Range:34 years to 62 years
% correct:6
% ± 5 years:13

Patient 6

Actual Age:66 years
Mean:68.9 years
CI:67.7 years to 70.2 years
Median:70 years
Range:55 years to 95 years
% correct:0
% ± 5 years:57

Patient 7

Actual Age:28 years

Mean:34.9 years

CI:34.1 years to 35.7 years

Median:35 years

Range:27 years to 47 years

% correct:2

% ± 5 years:42

Discussion

In this study we have demonstrated that undergraduate paramedic, paramedic/nursing students, and potentially novice paramedics, have difficulty in accurately estimating a person's age or at least being within five years either side of the actual adult age. This ability is required by paramedics as they are often called upon to estimate a person's age, adult or paediatric, as this forms the basis for drug calculations, other management regimens, and considerations for co-morbidities.

The use of images for estimating a person's age is not uncommon and has been used in previous psychology based studies, we therefore used this in preference to using real people primarily due to their availability and ethical considerations.^{3, 7-12}

Using facial features as a cue to a person's age has been described by many authors. Berry and McArthur first described features such as the colour and presentation of the hair, the appearance of the skin, dispersal of fat tissue, size of the nose, ears and eyes, and the dimension of the lips as means of determining a person's age.⁷

Dehon and Bredart found that estimations of a male ages were more accurate than estimation of a female ages by a non-descript group of volunteers, and that Caucasian participants were better at estimating ages of other Caucasians. The same was found for Africans estimating ages of Africans, estimations of a male ages were also more accurate than females.⁹ In this study we used all Caucasian images with students having great difficulty in estimating the age of most patients. This may be attributable to several reasons including: the lack of experience of students relating facial features to a person's approximate age;¹¹ and a lack of thought about comparisons with immediate family and friends' facial features and age.¹⁰ Based on the experience of Dehon and Bredart with African age estimations we would expect the students to perform worse when estimating ages of other races like Africans and Asians.⁹

This study has highlighted a need to educate undergraduate paramedic, paramedic/nursing students, and novice paramedics, in a method of age estimation and some of the cues to use in this process. A study by Sorqvist and Eriksson proved that age estimation training significantly improved the accuracy of age estimation in those participants who undertook the training.⁶ Over or under estimating the age of an adult patient may make little, if any difference, to their overall management, though special consideration should be given to

elderly patients given the increased likelihood for co-morbidities¹³ and potential alterations to pharmacodynamics and pharmacokinetics.¹⁴ However, in paediatric patients this inaccuracy may lead to incorrect treatment and may have potentially harmful short term outcomes.¹⁵

This study is potentially limited by students viewing PowerPoint presentation slides to provide their estimations and not viewing a real person. The study is also limited with only using two paediatric patients in the estimations. As this was a pilot study, the sample size was small, hence the results lack external validity and should be interpreted with caution.

Conclusions

This pilot study suggests that undergraduate paramedic and paramedic/nursing students, and potentially novice paramedics, lack the ability to accurately estimate the age of a range of patients. This study has provided teaching staff for undergraduate paramedic/nursing students with sufficient information to enable better age estimations methods to be incorporated into the clinical curriculum. The study has highlighted a need for further research into better preparing undergraduate students to function in a safe and competent manner in clinical practice.

References

1. Bruce V, Ellis HD, Gibling F, Young A. Parallel processing of the sex and familiarity of faces. *Canadian Journal of Psychology Revue Canadienne de Psychologie*. 1987;41(4):510-20.
2. Bruyer R, Lafalize A, Distefano M. Age decisions on familiar and unfamiliar faces. *Behavioural Processes*. 1991;24(1):21-35.
3. Bruyer R, Mejias S, Doublet S. Effect of face familiarity on age decision. *Acta Psychol (Amst)*. 2007;124(2):159-76.
4. Rossion B. Is sex categorization from faces really parallel to face recognition? *Vis cogn*. 2002;9(8):1003-20.
5. Rossion B, Schiltz C, Robaye L, Pirenne D, Crommelinck M. How does the brain discriminate familiar and unfamiliar faces?: A PET Study of face categorical perception. *J Cogn Neurosci*. 2001;13(7):1019-34.
6. Sorqvist P, Eriksson M. Effects of training on age estimation. *Appl Cogn Psychol*. 2006;21(1):131-5.
7. Berry DS, McArthur LZ. Perceiving character in faces: the impact of age-related craniofacial changes on social perception. *Psychol Bull*. 1986;100(1):3-18.
8. Burt DM, Perrett DI. Perception of age in adult Caucasian male faces: computer graphic manipulation of shape and colour information. *Proceedings Biological Sciences*. 1995;259(1355):137-43.
9. Dehon H, Bredart S. An 'other-race' effect in age estimation from faces. *Perception*. 2001;30(9):1107-13.
10. George PA, Hole G. Factors influencing the accuracy of age estimates of unfamiliar faces. *Perception*. 1995;24(9):1059-73.
11. George PA, Hole GJ. The role of spatial and surface cues in the age-processing of unfamiliar faces. *Vis cogn*. 2000;7(4):485-509.
12. Stathopulu E, Hulse J, Canning D. Difficulties with age estimation of internet images of South-East Asian girls. *Child Abuse Review*. 2003;12(1):46-57.
13. McCance K, Huether S. *Altered Cellular and Tissue Biology. Pathophysiology: The Biologic Basis for Disease in Adults and Children*. 5th ed. St Louis Missouri: Elsevier Mosby; 2006. p. 82.
14. Galbraith A, Bullock S, Manias E. *Paediatric and Geriatric Pharmacology. Fundamentals of Pharmacology*. 4th ed. Frenches Forrest: Prentice Hall; 2004. p. 172-83.
15. Luscombe M, Owens B. Weight estimation in resuscitation: is the current formula still valid? *Arch Dis Child*. 2007;92(5):412-5.

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