EEG in Investigating NEAD

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Aims

Assess the role of verbal suggestion in inducing PNES

- The effect of suggestion on the yield of PNES
- The effect of the number of times suggestion used on yield
- Provocation of non habitual attacks by use of suggestion

Assess other factors which may influence capture of PNES

- Length of recording
- Presence of extra personnel in the room
- Whether electrodes are in place

Assess patient safety in EEG for PNES

- Incidence of adverse events
- Availability of professional help for severe PNES

Methods

- 52 EEG departments
- Pro forma for consecutive EEG patients
- 6 months
- 12, 738 responses
- Ratio of adults to children 3:1
- Ratio of male to female 1:1
- Mean age = 38, range 5-100

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FORM B: Please complete for all routine/prolonged/sleep EEGs over the age of 5

Postcode of Centre (Please complete)		**Local EEG number** (Please complete):		**Project code** (Do not complete – for office use only)	

1. Patient Details: Age: Gender: Type of Recording: Length of Recording:	 …….. M/F Routine / Prolonged / Sleep ……. (minutes)
2. What was the referral diagnosis?	Epilepsy Non-Epileptic Attack Disorder (NEAD) Epilepsy and/or NEAD Other
3. Were 'suggestive' techniques used during the recording?	Yes/No
4. If suggestive techniques were used, when were they applied (circle all that occurred)	Before start of recording During resting record Before Hyperventilation Before Photic Stimulation
5. Who was present for the **duration** of the recording other than yourself? (circle all that apply)	Friend/Relative/Carer Doctor Nursing staff Additional Clinical Physiologist(s) No one
6. Did a clinical attack occur during this hospital visit for EEG?	Yes : **Proceed to question 7 & continue** No: **Do not complete any further questions**
7. At what point in the recording did the patient have the attack (circle all that apply)	Before start of recording or during preparation Resting record Hyperventilation Photic stimulation After EEG electrodes disconnected
8. How many minutes after the start of the recording did the attack occur?	
9. Was the attack:	Epileptic Psychogenic Non-Epileptic Other Non-Epileptic eg breath holding, vaso-vagal (Please state) Diagnosis uncertain
10. If the attack was Psychogenic Non-Epileptic, were the clinical features mostly (circle all that apply)	Obvious thrashing around Slumping Unresponsive Other (please state)
11. Who attended the patient during the attack? (circle all that apply)	Yourself Additional Clinical Physiologist(s) Doctor Nursing staff
12. Was the recorded attack of the habitual type?	No Yes / Yes but less severe / Yes but more severe Uncertain
13. Did any adverse events occur during/after the attack?	Yes / No
14. If yes, what type of adverse event occurred?	Injury to patient Patient required hospital admission Injury to staff Equipment damage Complaint from patient/carer Other (please state)
15. Was there unequivocal epileptiform activity in the **inter-ictal** EEG ie. sharp waves /spikes with or without slow waves	Yes/No

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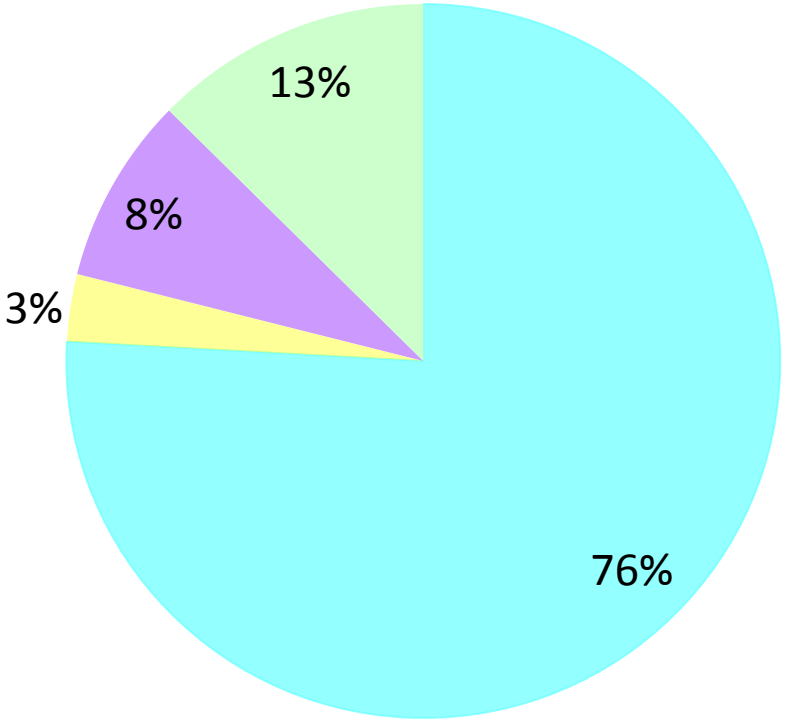
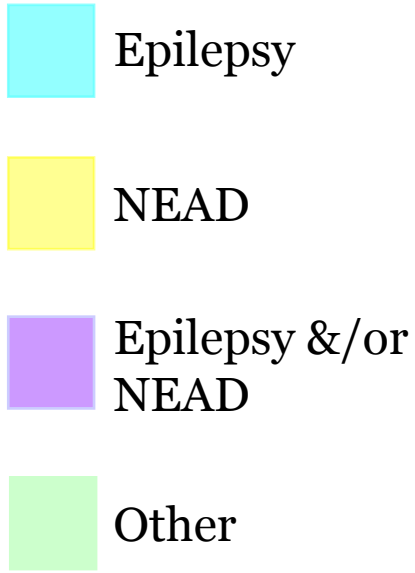
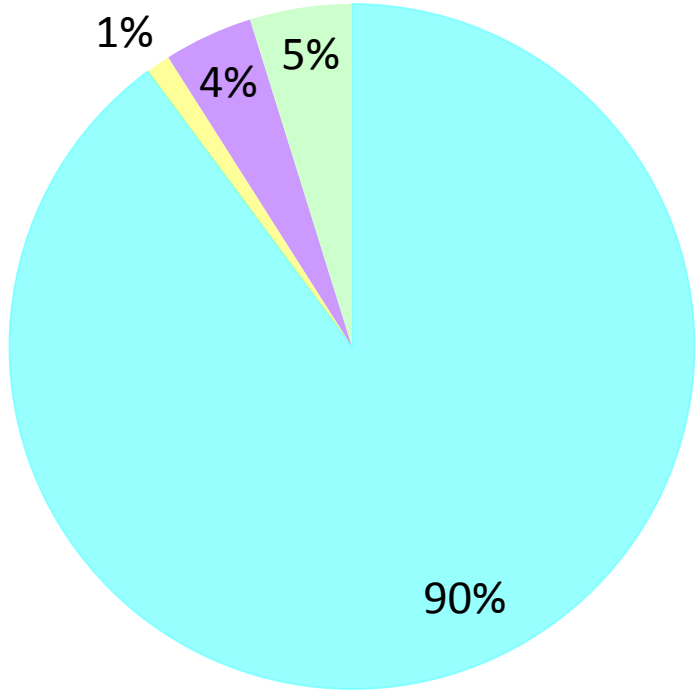
Why were Patients Referred?

Adult Referrals n =9775





Child Referrals n = 2963



Type of Attack

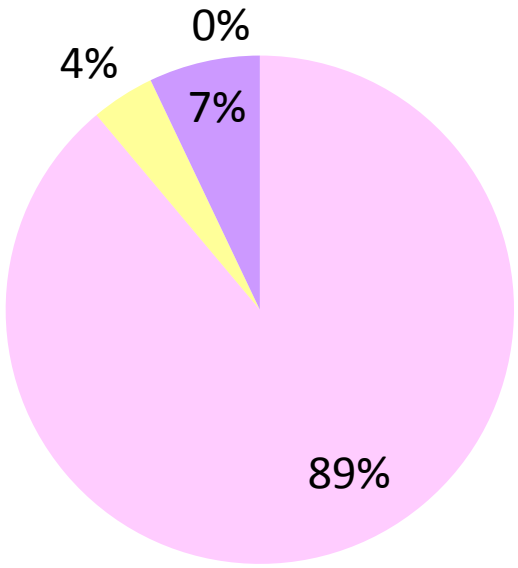
886 patients had attacks during the EEG

- Psychogenic 371
- Epileptic 284
- Other non-epileptic 82
- Uncertain 149

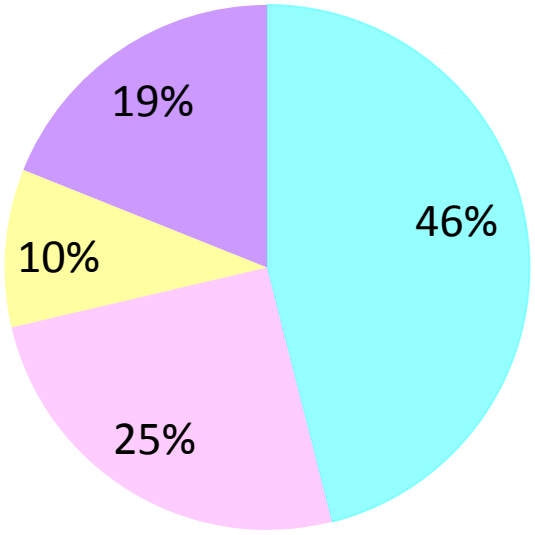
	Adults n = 9775	Children n = 2693
Psychogenic	3%	2%
Epileptic	1%	6%
Other Non-epileptic	0.6%	0.7%

Comparison of Referral Diagnosis to Type of Attack

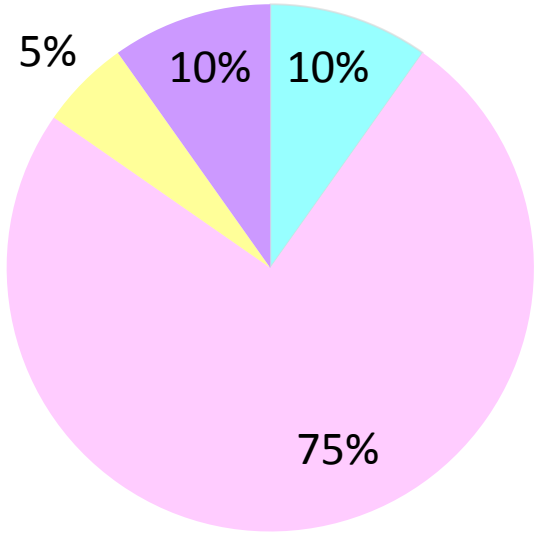
Referred with ? NEAD
n = 99



? Epilepsy
n = 565



? Epilepsy/? NEAD
n = 163



Epileptic

Psychogenic

Other Non-epileptic

Diagnosis Uncertain

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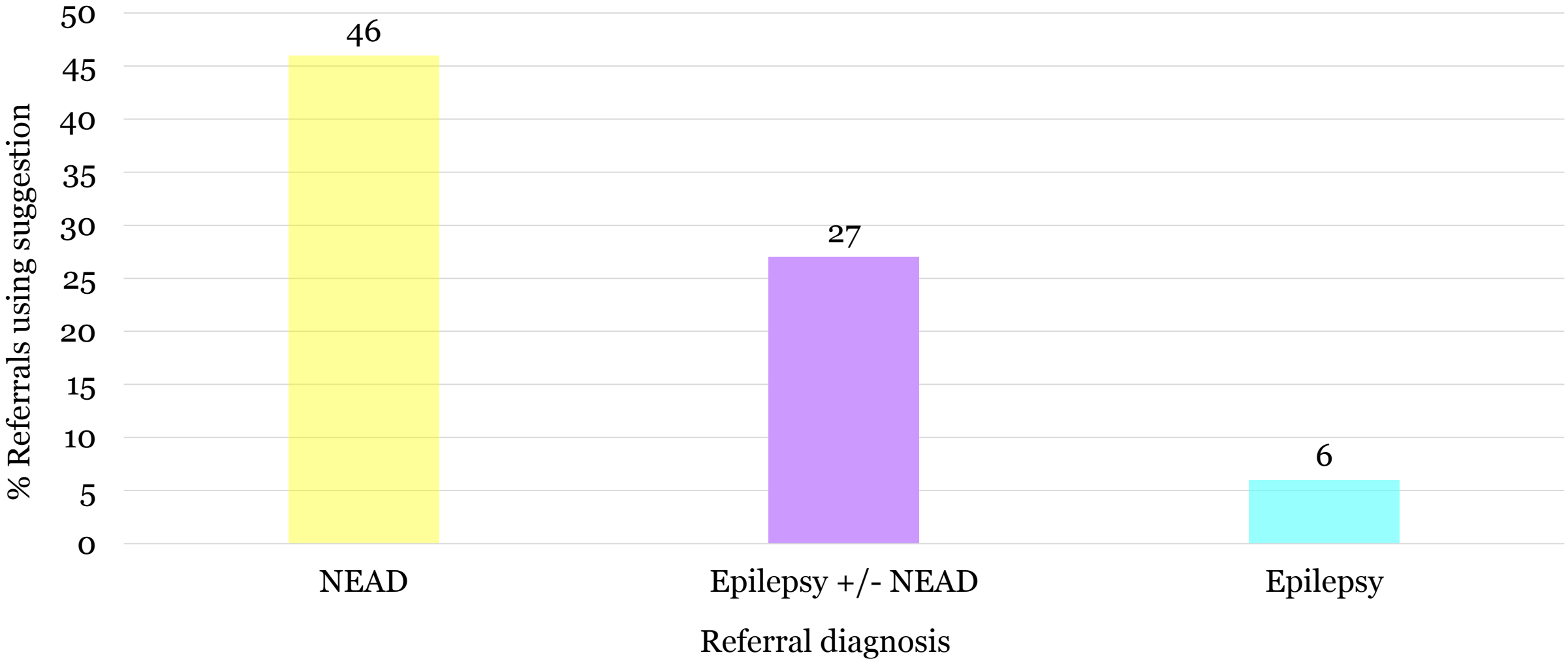
Were suggestive techniques used?



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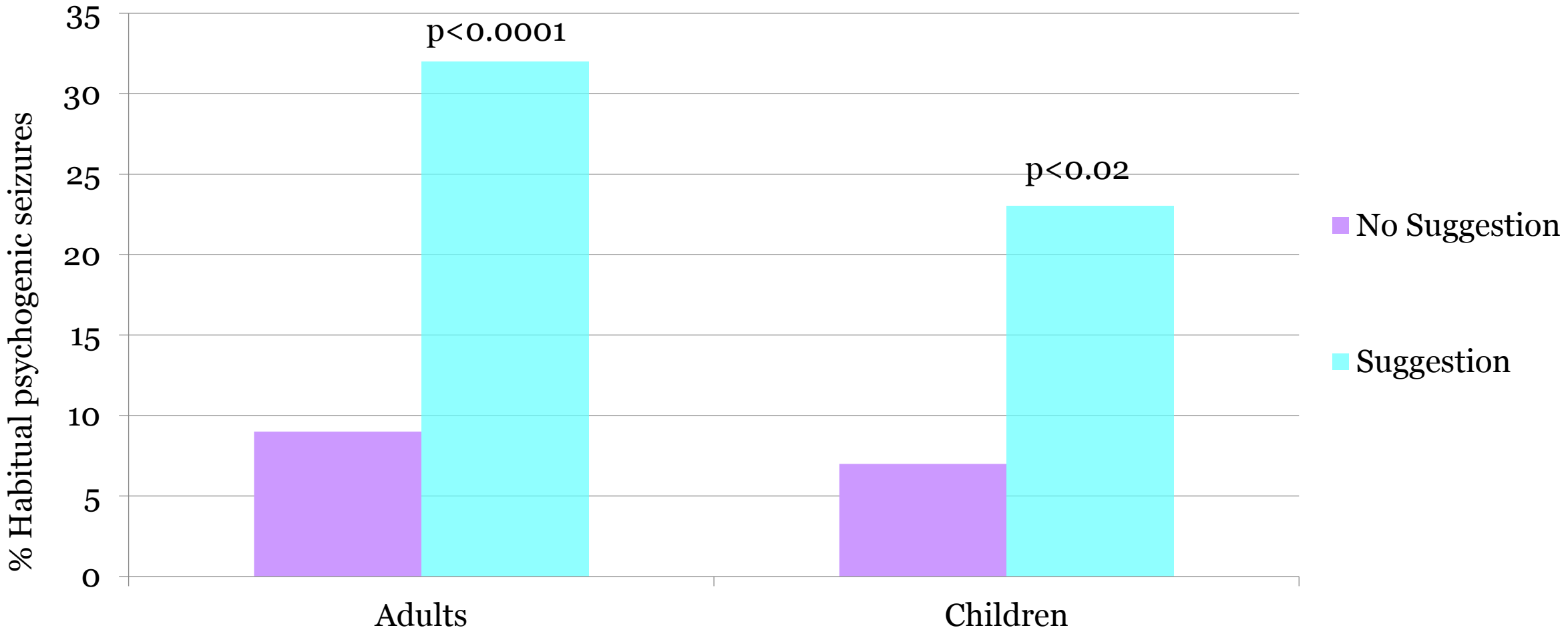
Did Suggestion Make a Difference?



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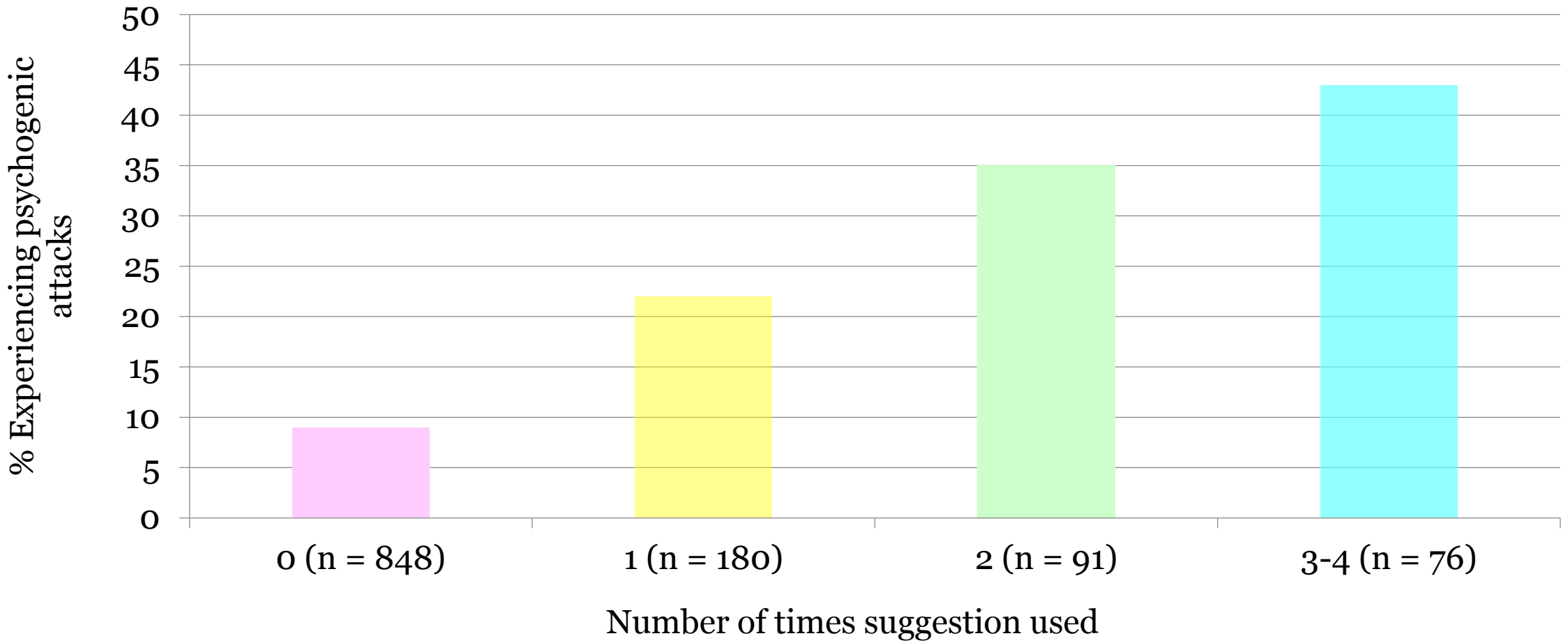
Did number of times suggestion used make a difference?



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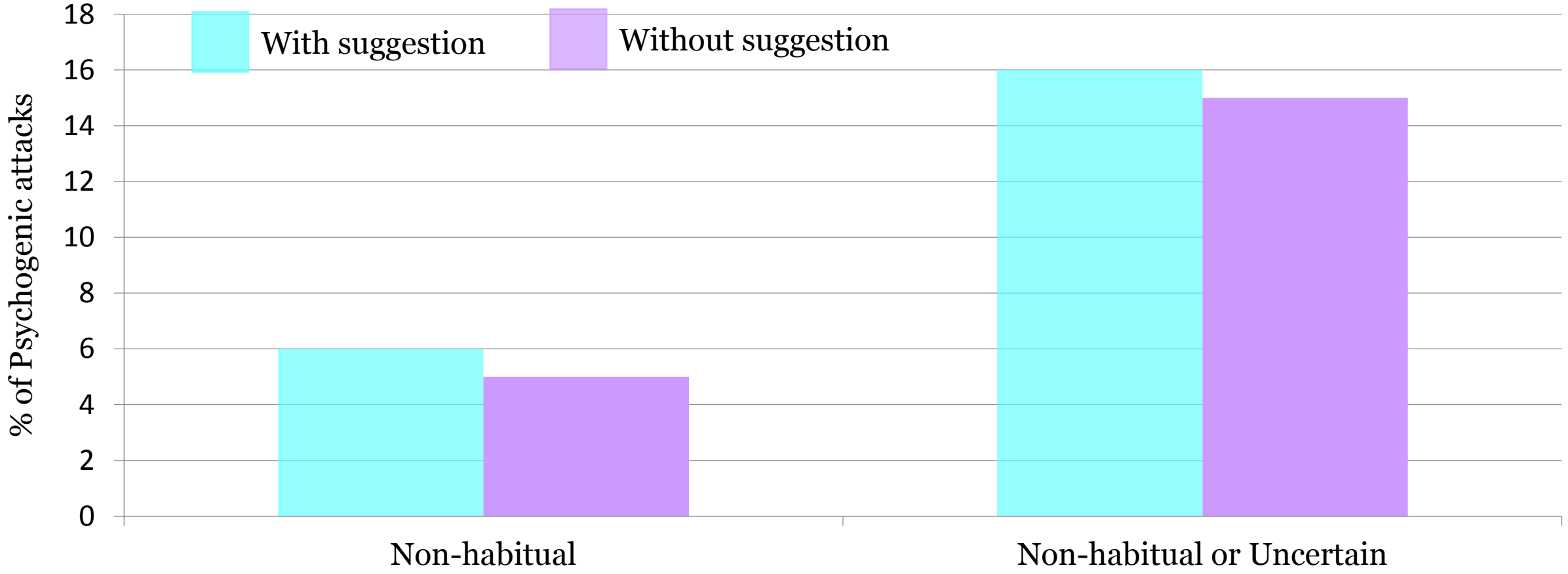
Does suggestion provoke non-habitual attacks?



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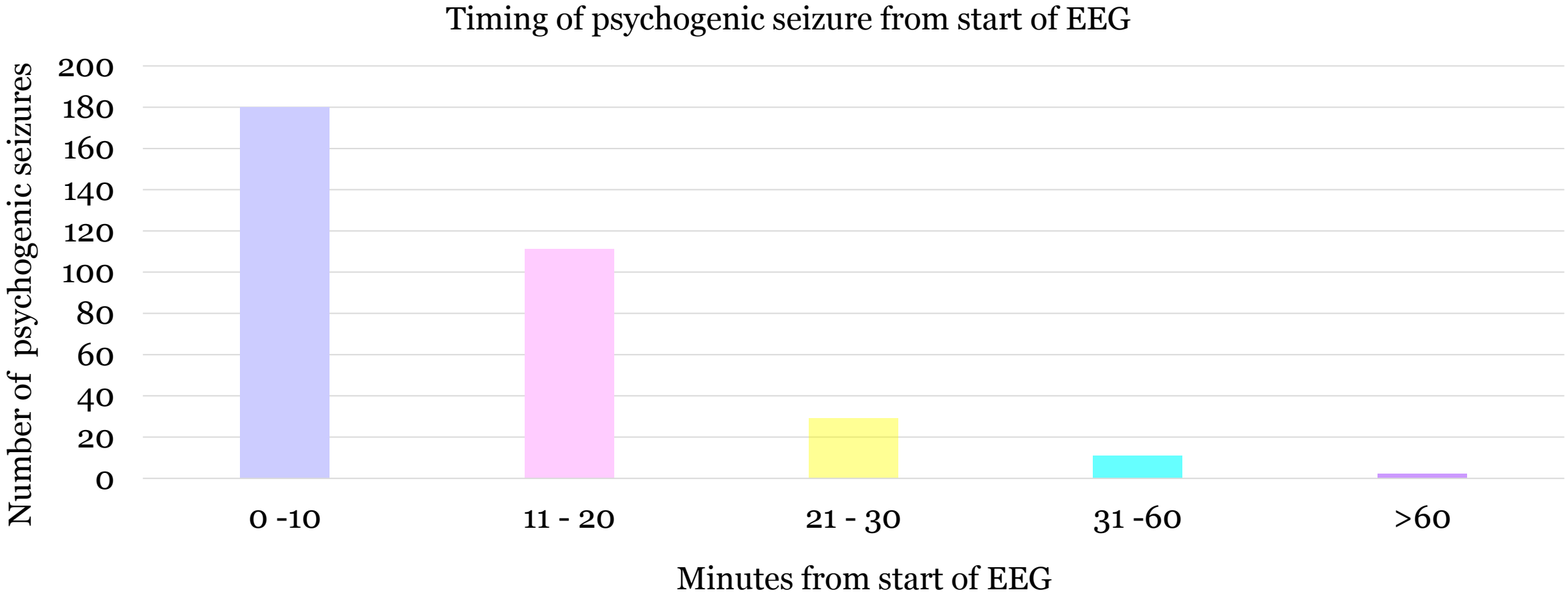
Does prolonging the EEG increase yield of attacks?



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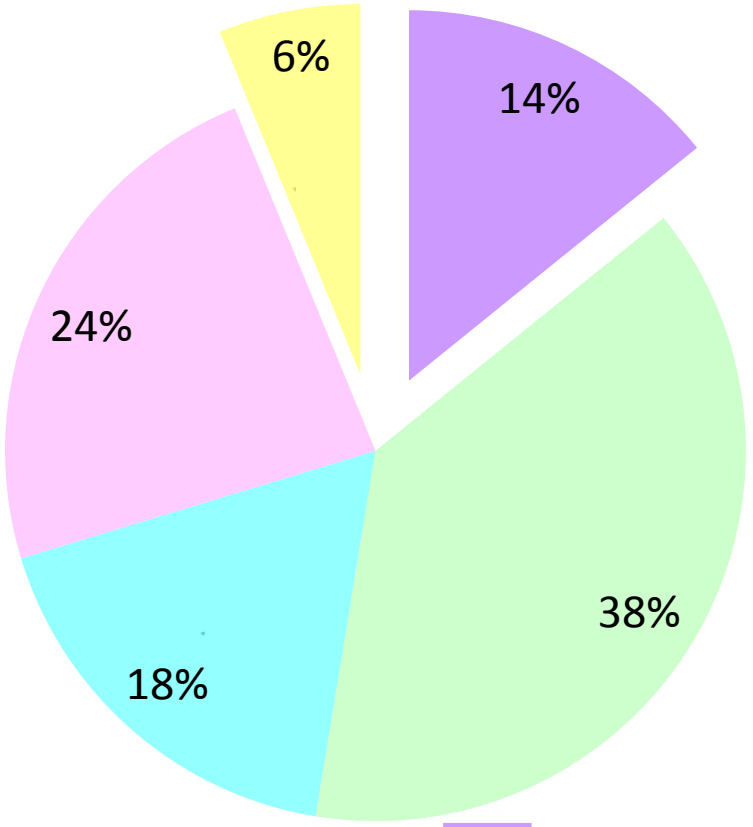
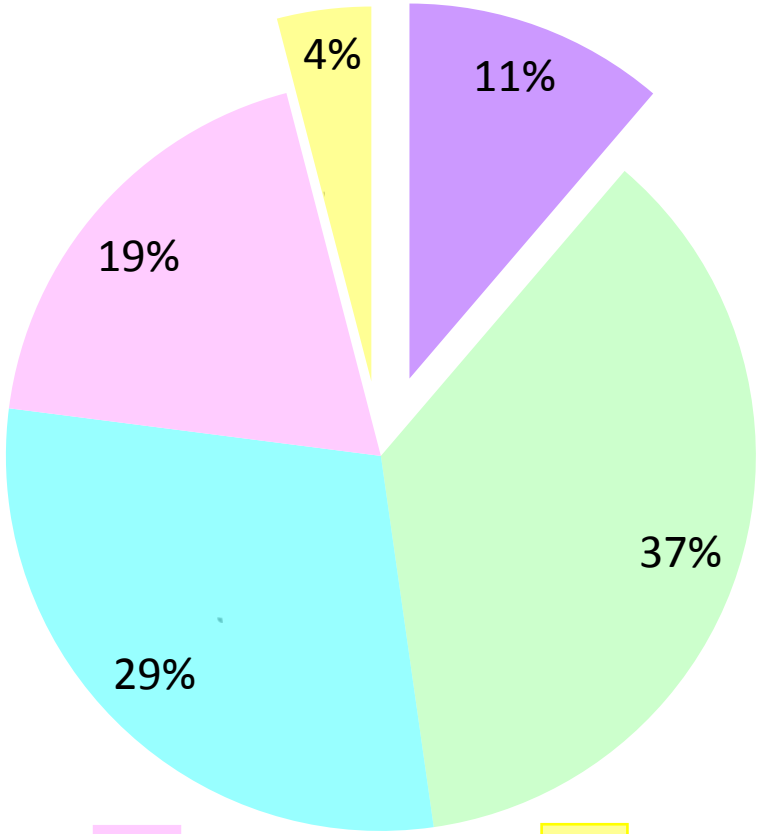
Do PNES occur when electrodes not in situ?

Timing of NEAD attack

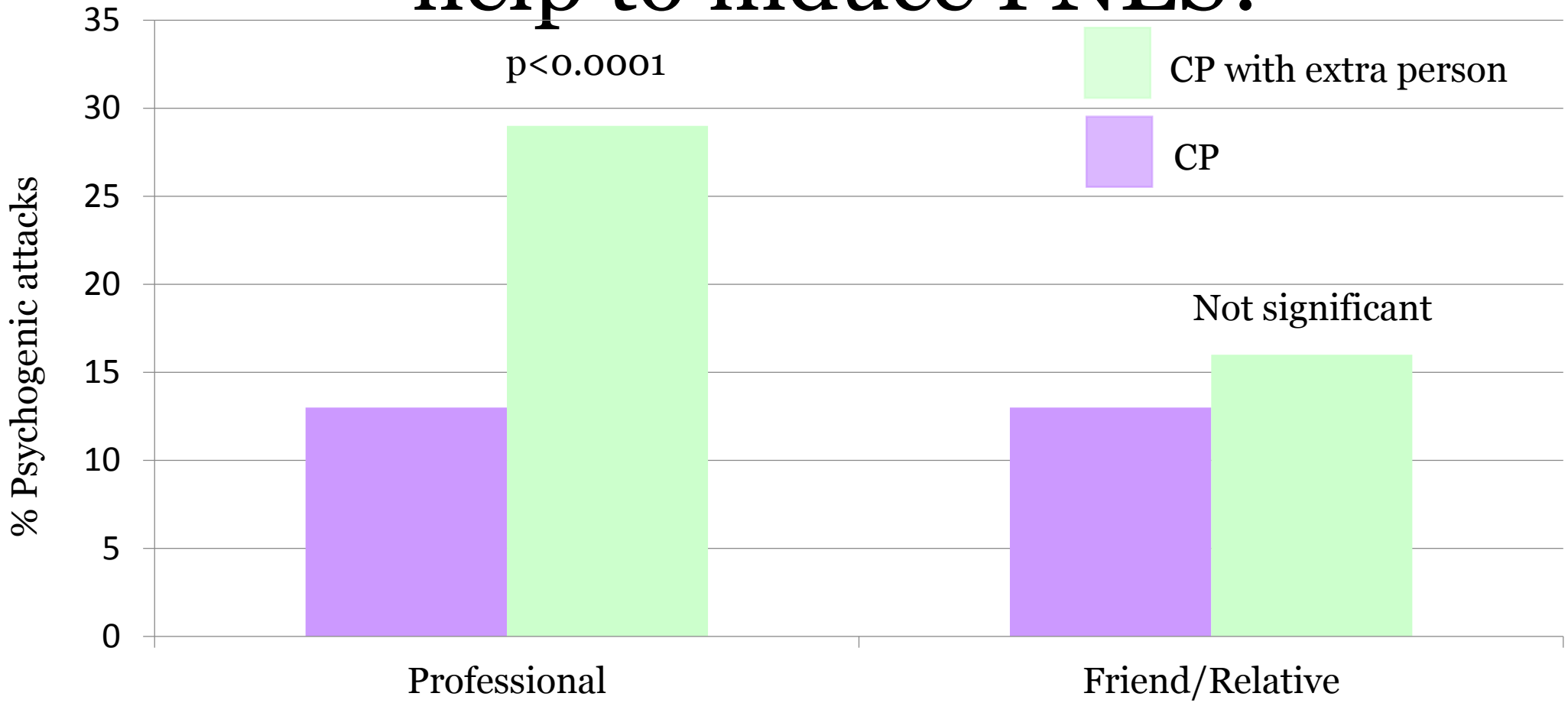


Timing of Epileptic Attack



Resting Record Before HV PS After

Does having extra people in the room help to induce PNES?



Safety: were there any adverse events from PNES?

2 injuries

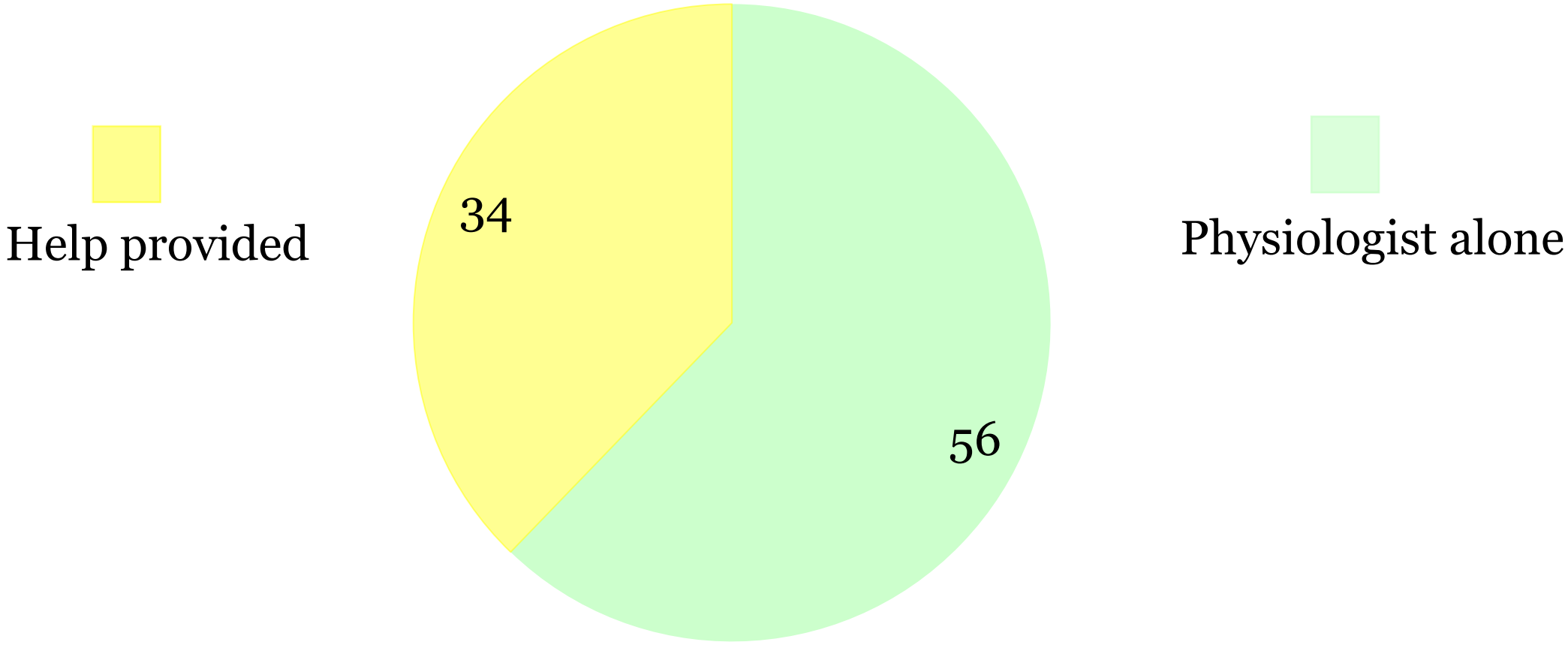
8 reported adverse events

6 other

Patient injured, Staff member injured

Shaky, speech problems, sick, ataxia, headache, weakness

Safety: was there help for the more severe PNES?



Conclusions

The role of verbal suggestion in inducing PNES

- At present one third of EEGs for NEAD utilise suggestive techniques
- Suggestion significantly improves the yield of PNES
- The more times suggestion used during the EEG the better the yield
- Suggestion does not increase the provocation of non-habitual attacks

Other factors which may influence capture of PNES

- Prolonged recordings of over 30 minutes do not improve the yield of PNES
- Presence of professional personnel in the room improves yield of PNES
- PNES rarely occur only before electrodes are attached or when they have been removed

Patient safety in EEG for PNES

- Adverse events rarely occurred during PNES
- Additional professional help for severe PNES was given in a third of attacks

Standards for EEG performed where NEAD forms part of the differential diagnosis

Standard 1: The information sent to the patient prior to their appointment requests they are accompanied by a witness who has observed previous attacks.

Standard 2: Video recording is initiated from the time of entry into the clinical room and continues until the patient departs (subject to patient consent).

Standard 3: The recording physiologist obtains a clinical history from the patient/witness including a detailed description of the habitual attacks.

Guideline: The physiologist confirms the attack type with the patient/witness by repeating back to them the description. This confirmation of attack semiology is documented with the clinical history by the physiologist.

Standard 4: Verbal suggestion is used in adults and children

- The recording physiologist emphasises the importance of capturing a typical attack
- The possibility of activation techniques (photic stimulation and hyperventilation) inducing typical attacks is stated both before recording and again prior to each activation technique.
- The use of verbal suggestion is documented in the report including if verbal suggestion was used to encourage the attack to end.

Guideline: A standardised dialogue is used for verbal suggestion techniques

Example:

- *You have been referred so we can diagnose your condition and you can receive the right treatment*
- *To make the diagnosis it is important to record one your attacks*
- *We will ask you to do deep breathing and show you flashing lights*
- *This might help bring on one of your usual attacks by putting some stress on your system*
- *You will be quite safe if an attack occurs*
- *Please let me know if you feel your symptoms coming on during the EEG*

Standard 5: The EEG recording is continued for at least 5 minutes after the cessation of the final activation technique

Standard 6: Additional staff are available to assist with patient/staff safety in case of non-epileptic attacks with severe motor manifestations.

Guideline: Additional staff are present for the duration of the EEG to improve likelihood of a clinical attack occurring.

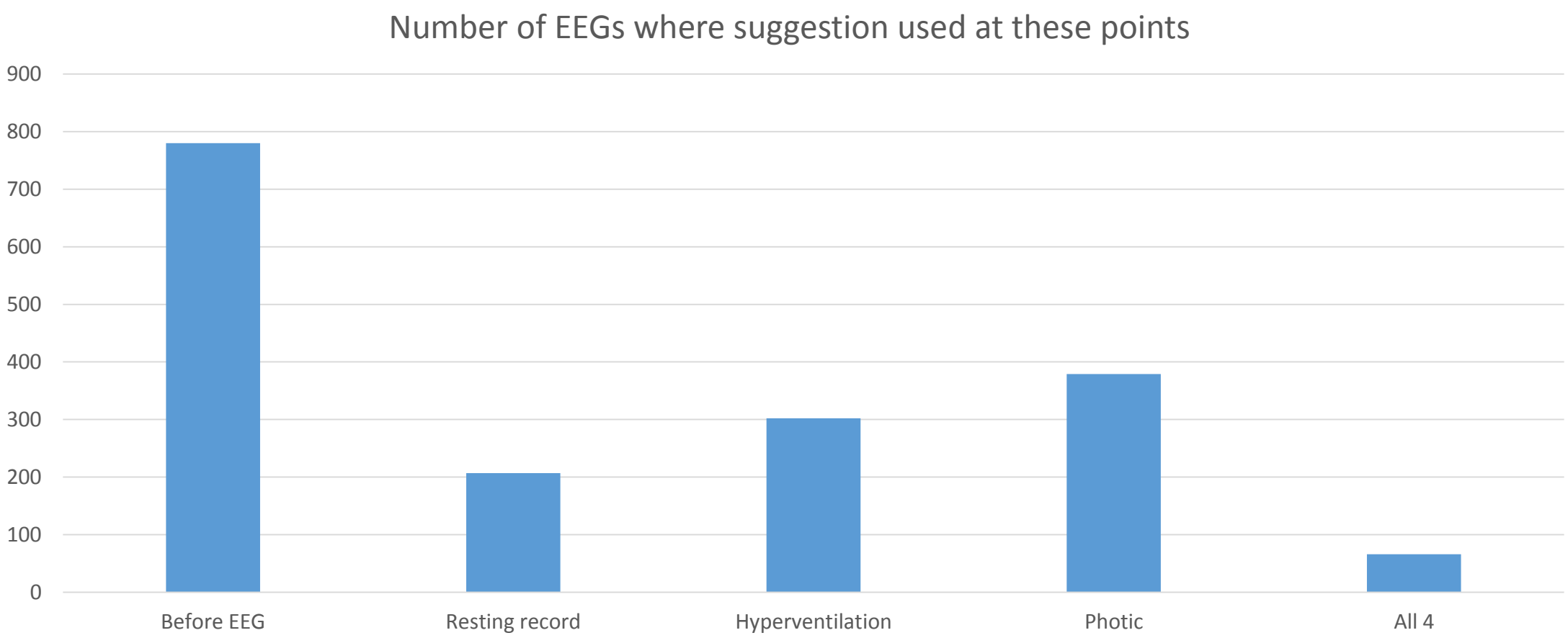
Standard 7: During a non-epileptic attack, ictal testing is performed including tests of responsiveness (e.g. to verbal command) and avoidance testing (e.g. resistance to eye opening, position of dropped arm).

Standard 8: Confirmation that the recorded attack was of the habitual type is obtained from the patient and/or witness and this is stipulated in the report.

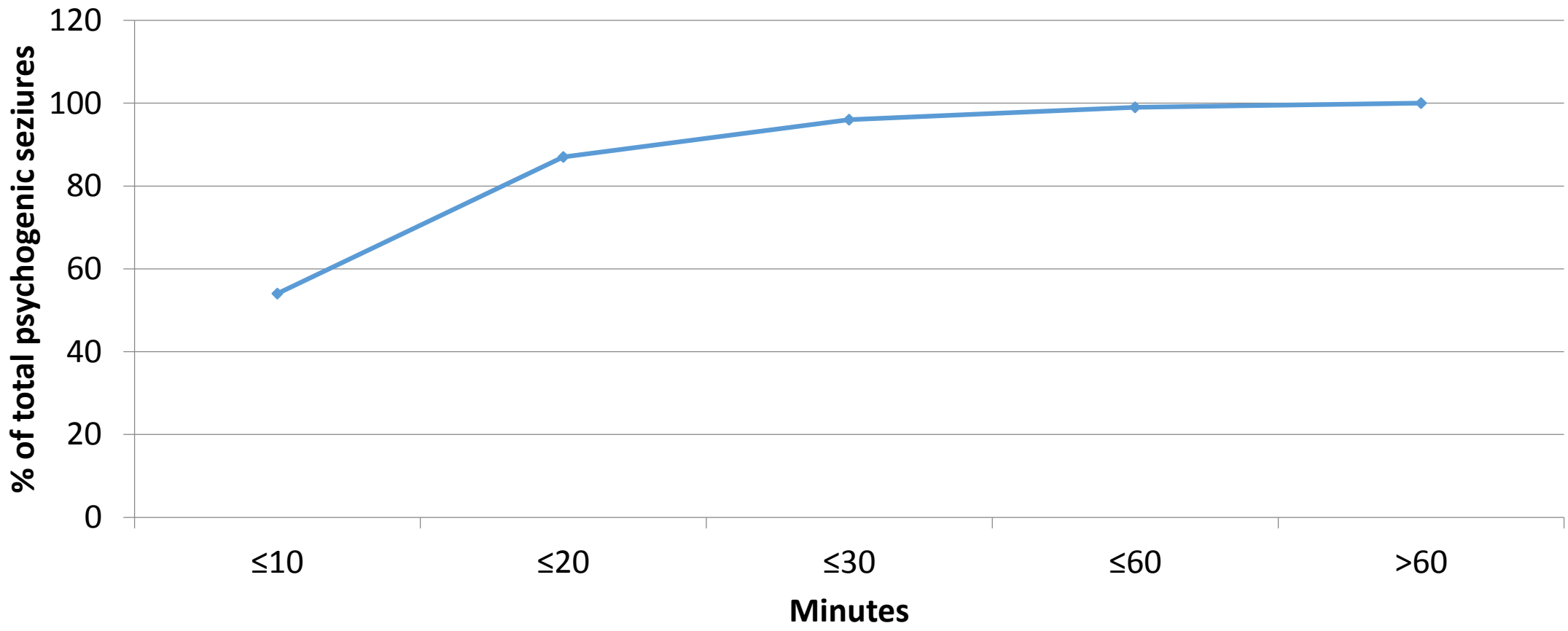
Standard 9: The semiology and approximate length of the captured attack(s) are described in the factual report.

Standard 10: The report describes the EEG appearances including the presence of alpha and other normal rhythms before, after and during the attack.

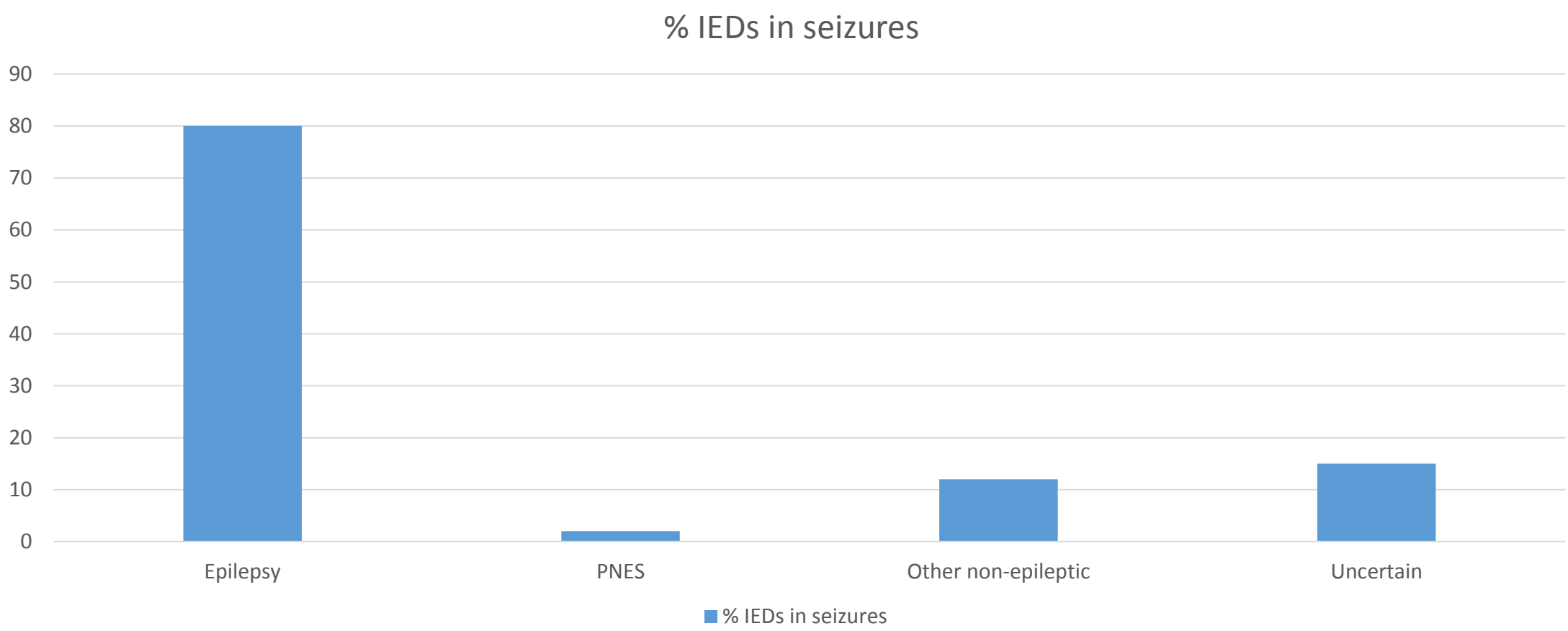
When was suggestion used?



Yield of seizures according to length of EEG:



Do patients with PNES have IEDs?



Does the type of professional staff matter?