



EAR PREFERENCE AND MOBILE PHONE USE

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INTRODUCTION

Why is it important to know more about mobile phone use and ear preference?

- Mobile phone use is common and on the increase.
- Various medical symptoms and disorders have been linked to mobile phone use, the most serious being brain tumours. Previous studies have yielded conflicting evidence.^(1,2)
- Should the radiofrequency exposure associated with mobile phone use increase the risk of adverse health effects even slightly, the implications for public health would be significant.
- It is possible that the known long latency for the development of brain tumours is the main reason for the lack of evidence for a causal association between radiofrequency exposure from mobile phones and cancers of the brain.
- Any comprehensive epidemiological study on mobile phone use and brain tumours must incorporate two things:
 - information about the side to which the phone is most frequently held during phone calls
 - the anatomical position of the tumour

What do we know about how we use mobile phones?

- Surprisingly little. The few studies about phone use, handedness and ear preference were done on fixed telephones^(3,4)

Both studies found a left ear preference for fixed phone use. The ear to which a subject held a fixed telephone was mostly influenced by environmental factors, such as expectations regarding writing, dialing or other unimanual activities.

Right-handed people comprise between 88-96% of the population. Hence handedness seemed to be the dominant factor influencing lateral ear preference in fixed phone users.

- Mobile phones are usually used in very different circumstances to fixed phones, therefore we cannot assume that what is known about fixed phone behaviour applies.
- Studies of mobile phone users^(5, 4) found only a weak correlation between handedness and ear preference. Therefore handedness does not appear to be a useful means for identifying the preferred ear in mobile phone users.

AIMS

The aims of this study were:

1. to investigate the hand and ear holding patterns of mobile phone users.
2. to identify the factors which influence the user's choice of ear to which to put a mobile phone.

The hypotheses to be tested were:

1. that users of mobile phones would more commonly put the mobile phone to their right ear
2. the data on the preferred ear for mobile phone use would correspond to the distribution of hand dominance in the general population.

METHOD

The study was planned in two stages.

Study One: Six researchers carried out a passive observation task in various metropolitan locations of an unselected sample of 333 people who were observed talking on their mobile phones. The locations included an airport, racecourse, shopping centres, city streets and university campus. The 193 men (58%) and 140 women (42%) were allocated to one of 4 age categories: 0-18, 19-30, 31-60 and over 60 years of age. Eighty nine percent of the subjects were aged between 19 and 60 years. An observation sheet was used to record: the hand used to hold the mobile phone, the ear to which the phone was placed, activity at the time (this included walking or sitting, encumbered or unencumbered), age estimation, gender.

Study Two: The same 6 researchers initially observed a new sample of 104 people talking on a mobile phone and recorded the same categories of data as in Study One. They subsequently asked the individuals to volunteer to complete a short oral questionnaire.

The 46 men (44%) and 58 women (56%) were allocated to one of the 4 age groups established for Study One; 98% of the subjects were aged between 19 and 60 years. Three subjects, 2 women and 1 man, declined to participate with completion of the questionnaire.

The questionnaire asked 6 questions related to: preferred ear for mobile phone use and the reason for the preference, the person's handedness, which hand is usually used to hold the mobile phone and the reason for the preference, which ear the person would offer if listening to a whisper or to a quiet sound.

RESULTS

Study One

The majority of the subjects were walking (79%) and unencumbered, ie. not using their other hand (62%) when observed using their mobile phone.

Hand used	Frequency	Percent
Left	143	42.9
Right	190	57.1
Total	333	100.0

Ear used	Frequency	Percent
Left	139	41.7
Right	194	58.3
Total	333	100.0

Table 1. Observed hand for holding the mobile phone and ear to which the mobile phone was put.

Hand used to hold phone	Ear to which mobile phone was put		
	Left	Right	Total
Left	138	5	143
Right	1	189	190
Total	139	194	333

Table 2. Observations about hand and ear choice for mobile phone use.

A statistically strong relationship was found ($r = 0.000$, $p < 0.001$) between the hand used to hold the phone and the ear to which the phone was put. Only 1.8% of subjects used their contralateral hand and ear. No correlation was found between the hand or ear used and the specific activity of the person at the time. Further, the subjects' selection of hand to hold the phone and ear to which it was put showed no relationship to age or gender.

As the proportion of subjects using the mobile phone with their right hand, 57%, was less than the proportion of right handed people in the population, we proceeded to Study 2 to further investigate phone holding behaviour.

Study 2:

Observation results

Study Two included observations of mobile phone use in domestic residences (34%) in addition to the range of venues used for Study One. A larger proportion of Study Two subjects were observed using their mobile phone while sitting (51%) compared to walking, however the majority of subjects were again categorised as 'unencumbered' with respect to use of the hand not holding the phone (69%).

A majority of subjects (65.4%) used their right hand to hold the mobile phone, with 33.7% using the left hand and 1% using no hand at all. The phone was put to the right ear in 66.3% of observations.

Questionnaire results

Question 1

When your mobile phone rings to which ear do you put it?	Frequency	Percent
Left	31	30.7
Right	68	67.3
Either	1	1.0
Don't know	1	1.0
Total	101	100.0

Table 3. Responses to question about the ear to which the mobile phone is normally put.

Question 2

Why do you prefer this ear?	Frequency	Percent
Dominant hand	45	44.6
Keep dominant hand free	5	5.0
Easier to hear	14	13.9
Habit	11	10.9
For comfort	10	9.9
Do not know	8	7.9
Access reasons	6	5.9
Other	2	2.0
Total	101	100.0

Table 4. Reasons given for ear preference for mobile phone use.

Question 3

Do you consider yourself to be:	Frequency	Percent
Left handed	17	16.8
Right handed	80	79.2
Ambidextrous	4	4.0
Total	101	100.0

Table 5. Responses about handedness.

Question 4

With which hand do you hold your mobile phone?	Frequency	Percent
Left	31	30.7
Right	66	65.3
Either	4	0.9
Total	101	100.0

Table 6. Responses about the hand normally holding the mobile phone.

Question 5

Why do you use this hand?	Frequency	Percent
Dominant hand	59	58.4
Keep dominant hand free	9	8.9
Comfort	8	7.9
Access reasons	6	5.9
Habit	5	5.0
Do not know	4	4.0
Other	10	10.0
Total	101	100.0

Table 7. Reasons for hand preference using a mobile phone.

Question 6

Q. If someone is standing opposite you and wants to whisper in your ear, which ear would you offer to the person?

Response options: Left..... Right.....Either..... Don't know.....

(Supplementary question: If the response is "Don't know", ask: "What if you were listening to a very quiet sound?")

	Frequency	Percent
Left	20	19.8
Right	42	41.6
Either	16	15.8
Don't know	23	22.8
Total	101	100.0

Table 8. Responses about ear preference in a non-phone listening situation

There was a high level of agreement (88%) between the ear to which the subject had been observed to put the mobile phone and the stated ear to which the subject puts the phone ($p < 0.001$). There was a similar level of agreement (86%) between the observed and stated hand in which the subject holds the mobile phone ($p < 0.001$).

Two thirds of the subjects (66.3%) used their dominant hand to hold the mobile phone. However the relationship between hand dominance and preferred hand for holding the mobile phone was not statistically significant.

DISCUSSION

There was no statistical difference between Studies One and Two with respect to hand use. The right hand is observed to be used more frequently to hold a mobile phone (Study One: 57%, Study Two: 65%) and it is more frequently placed to the right ear (Study One: 58%, Study Two: 66%). These results supported Hypothesis One.

However, the proportion of people holding the phone in their right hand (above) was less than the proportion of right handed people in the general population. This result does not support Hypothesis Two.

The observation data also showed that subjects tended to use their ipsilateral hand and ear ($p < 0.001$). There was no relationship between age or gender and handedness for phone holding or the ear to which the phone was put.

The questionnaire results from Study 2 showed that the majority of subjects stated that they placed their phone to their right ear (67%). The most frequent reason given by the subjects was "dominant hand use."

Other commonly given reasons were "easier to hear," "habit" and "comfort."

Two questions asked about ear preference for listening situations which were unrelated to phone use. The majority of subjects stated they would prefer to use their right ear when trying to listen to a whisper or a quiet sound, however, 30-40% could not state a preferred ear for these situations. Therefore, unlike handedness, there is no clear evidence that subjects have an ear preference.

CONCLUSIONS

1. A person's preferred hand for holding a mobile phone cannot be reliably predicted from knowledge of their hand dominance. This study supported Funch et al⁽⁶⁾ in finding only a weak relationship between hand dominance and preferred hand to hold the mobile phone.

While the majority of subjects reported using their dominant hand to hold the phone, other major reasons for using a particular hand to hold the phone were: such as 'keeping the dominant hand free' and 'for access reasons.' These reasons still seem to implicate handedness as the determining factor.

2. Subjects were found to be reliable reporters of behaviours associated with their mobile phone use. Accordingly in future epidemiological studies investigating links between health effects and mobile phones self-report can be a reliable method of determining which side of the head was exposed to the radiofrequency dose from the phone.

3. Subject preference for listening tasks does not seem to be an important factor in selecting the ear to which they put their mobile phone. More influential factors seem to be hand preference for mobile phone use and convenience.

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