



Public Perception on Electromagnetic Field (EMF) Emissions from 5G Radio Communication Infrastructure and Consumer Premise Equipment (CPE) in Malaysia (EMFERCICE)

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INTRODUCTION



Through the National Digital Network (JENDELA) strategy, Malaysia has started the deployment of 5G. JENDELA hopes to offer 5G services at speeds of 100 Mbps by 2025.



Assumptions are being made that "many" Malaysians are against 5G and perceive the 5G radiation as harmful. Malaysian public perception may be shaped by the existence of fake news and misinformation sources, influencing the thinking and behaviour of readers.

Research Objectives

Research Questions

At what level do Malaysian public perceived the health effects of EMF?

Where does the Malaysian public get information on 5G EMF radiation?

How far does the Malaysian public understand the implications of the 5G base station and devices present in their vicinity?

What are ways to increase public trust in the safety of 5G EMF radiation?

To gauge the public's perception in Malaysia of the health effects of 5G EMF emissions

To identify the sources of 5G EMF information referenced by the public and examine their contributions to the public's perception.

To measure the level of public understanding of the implications of the 5G network base stations (BS) and consumer premise equipment (CPE) in their vicinity.

To provide recommendations for building public trust in the safety of 5G network BS and CPE

Nature of Study

- **Cross-sectional**
- **Quantitative**
- **Survey Strategy**
- **Deductive Reasoning**

Population and Sampling

- **Random sampling**
- **Krejcie & Morgan**
- **Minimum 400 respondents**

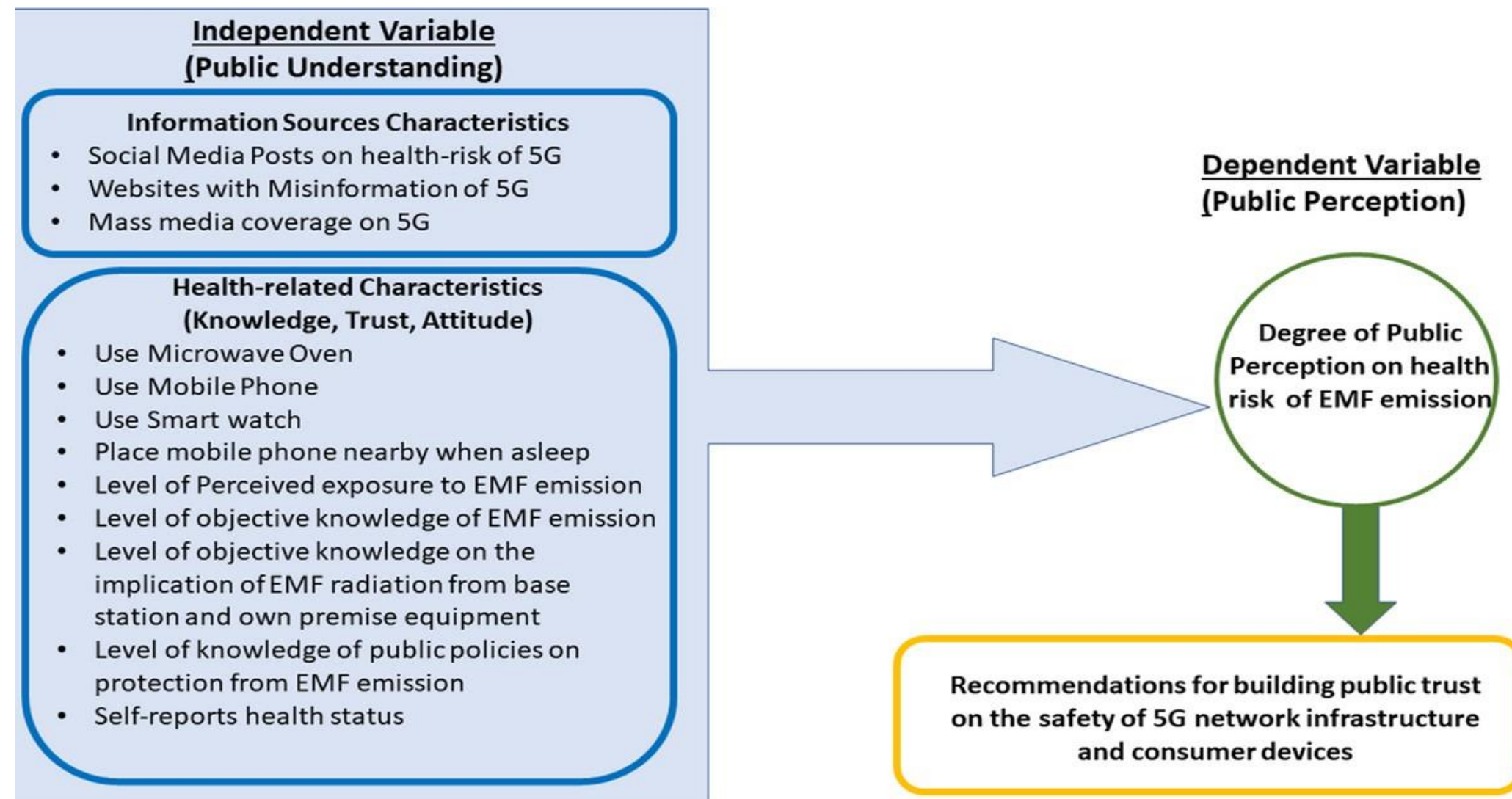
Data Collection

- **Online form (Google Form)**
- **Distribution through Email, social media**

Survey

- **6 sections**
- **48 questions including Comments/ Suggestions**

Conceptual Framework



DEMOGRAPHY OF RESPONDENTS

410
Respondents

15
Residential States

Top residential states

46.1%
Selangor

10.7%
WP Putrajaya

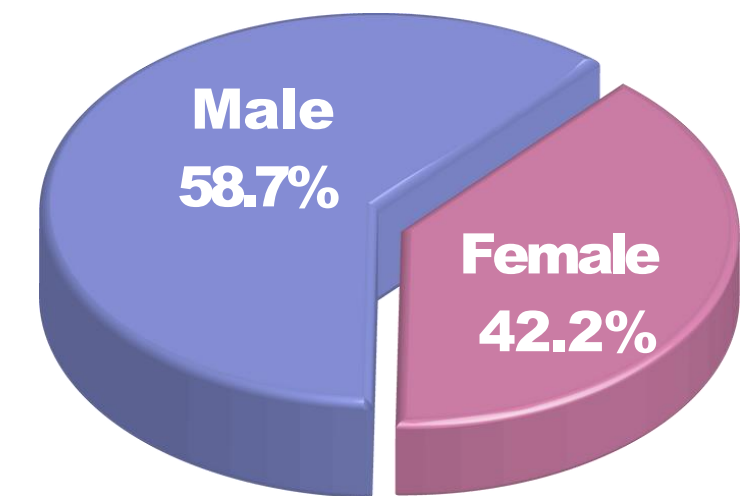
6.3%
Johor

5.9%
Terengganu

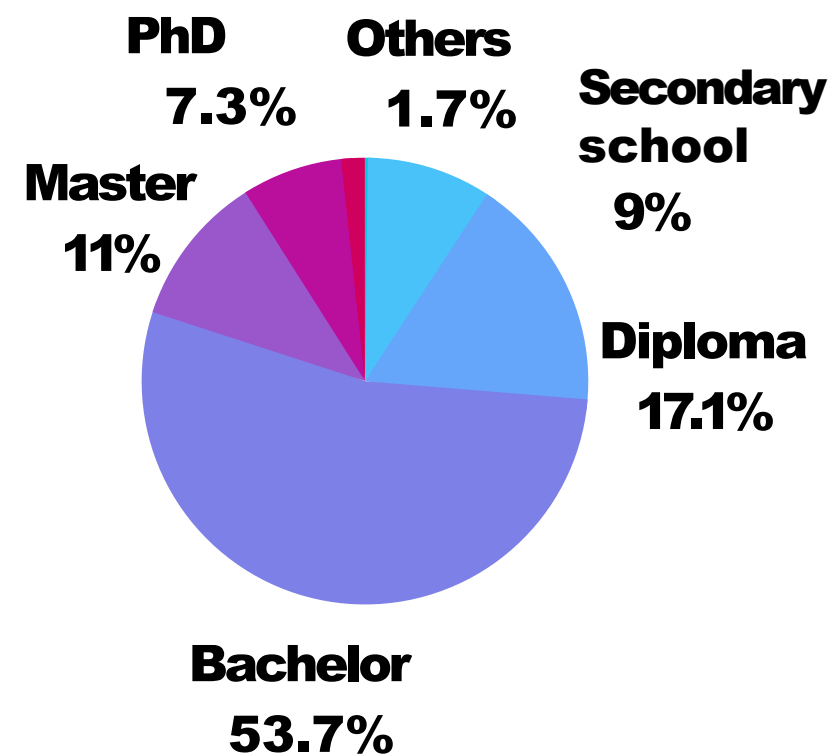
4.4%
Pahang

3.9%
Penang

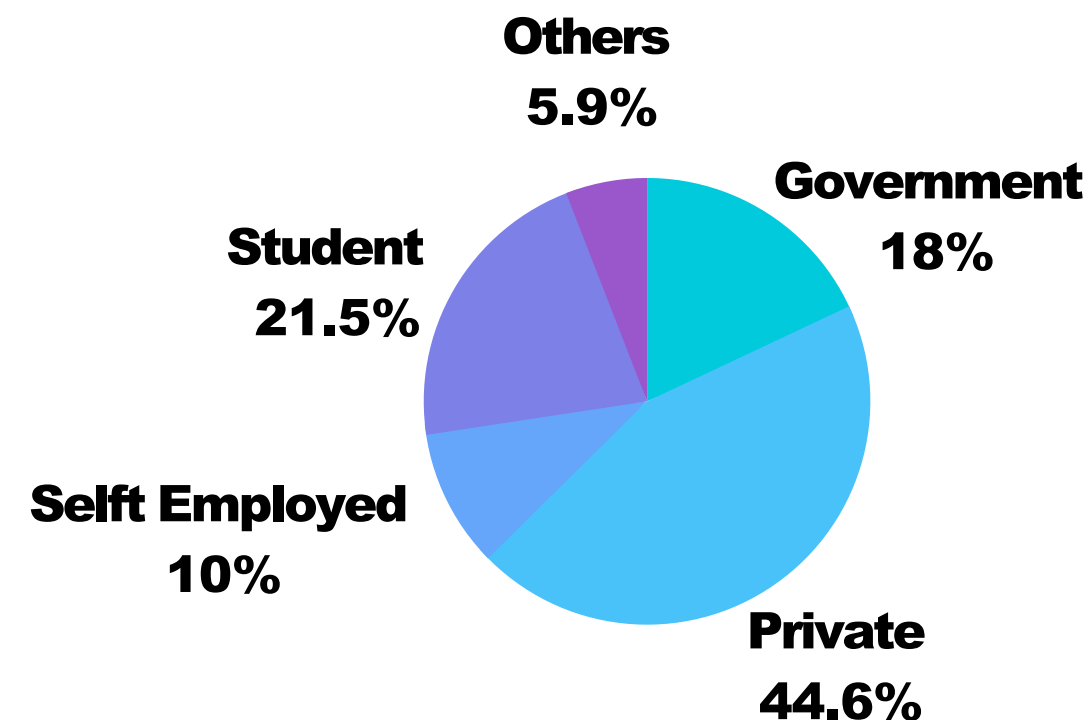
Gender



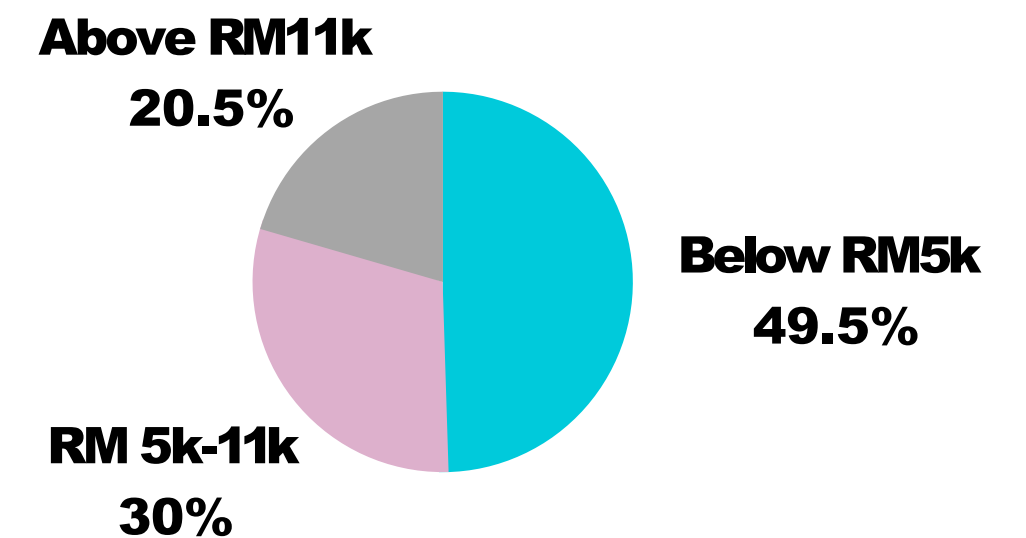
Level of education



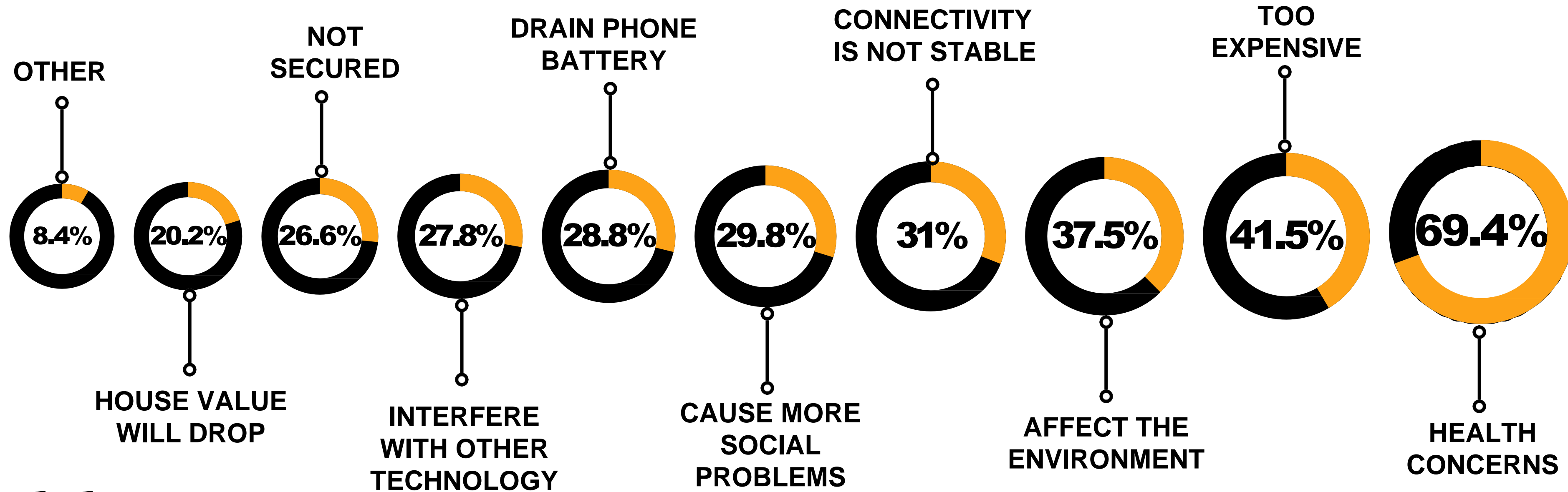
Employment



Monthly Household income



CONCERNS AROUND 5G



Top 3 concerns around 5G were the **health concerns, high cost and effect to the environment**. Similar trends were found in **France** ^[1] in 2019 (health – 52%, environment – 58% and the **UK** ^[2] (health – 44%, environment – 36%). However, Malaysian’s concern is **much higher for health risk** compared to both countries.



OBJECTIVE KNOWLEDGE IN 5G EMISSION

1. As more people use mobile phones at the same time, the number of base stations necessary to support the connection has to increase.

True **80.2%** False **19.8%**

3. When receiving a call closer to base stations, the magnitude of EMF emission emitted from the stations decreases.

True **35.9%** False **64.1%**

5. Less EMF emission are emitted from a mobile phone in an area where there is a better reception.

True **30.5%** False **69.5%**

2. The nearer a person is to a base station, the more the EMF exposure the person will receive.

True **73.4%** False **26.5%**

4. A specialised protective mobile phone cover exists that could effectively reduce exposures to EMF emission.

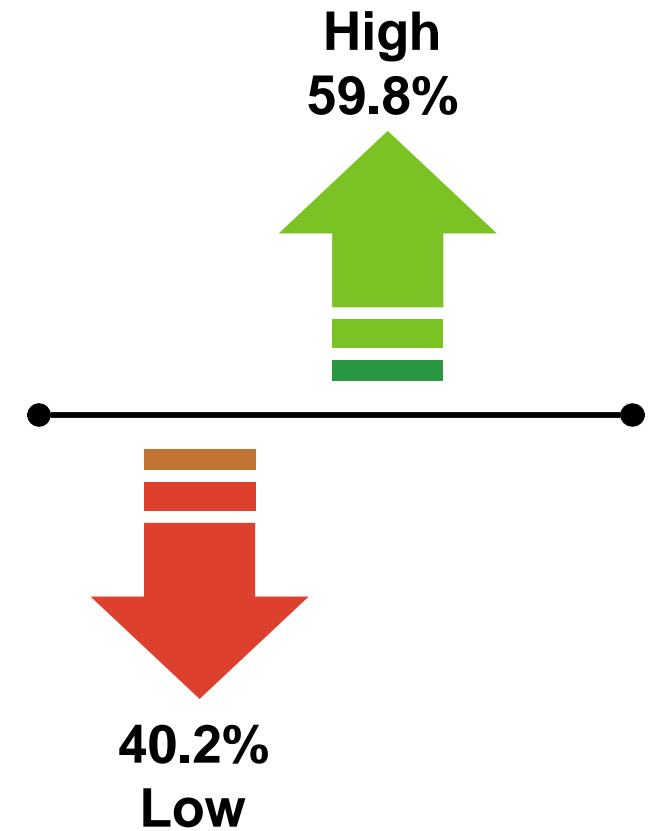
True **21%** False **79%**

6. If a hands-free mobile phone kit is used, (e.g. bluetooth-connected earphones) the level of EMF emission absorbed by a brain tissue can be reduced.

True **28.5%** False **71.5%**

Malaysian public objective knowledge level on 5G emission

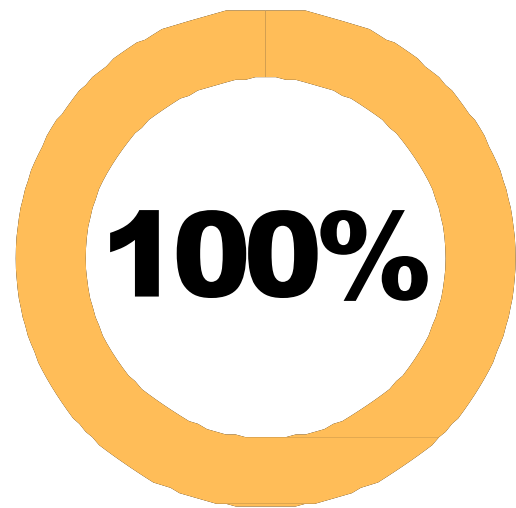
Mean Score = 2.81



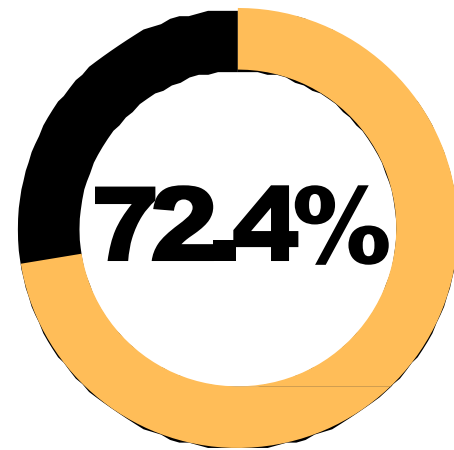
“ There are aspects in which the public’s knowledge and understanding are lacking (e.g., EMF shielding, Bluetooth, EMF emission). In Korea: 49.5% high and 50.5% low (13 questions) ”

Options: "True", "False" and "Do Not Know". "Do not know" was also counted as incorrect.

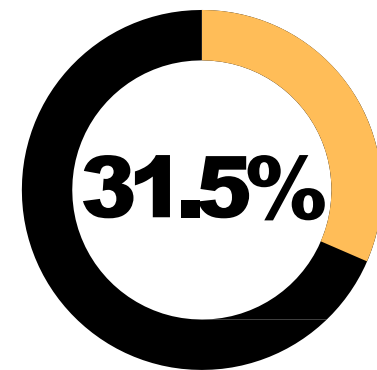
ATTITUDE RELATED TO EMF EMISSION



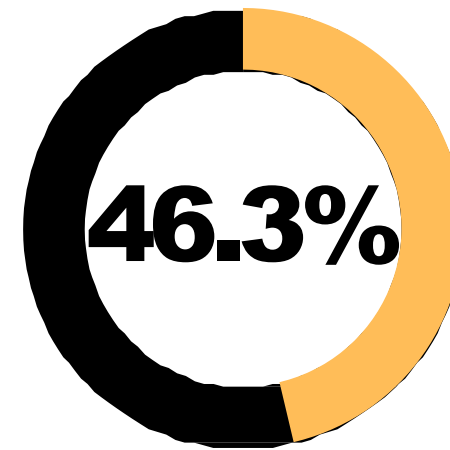
MOBILE
PHONE USERS



MICROWAVE
OVEN USERS



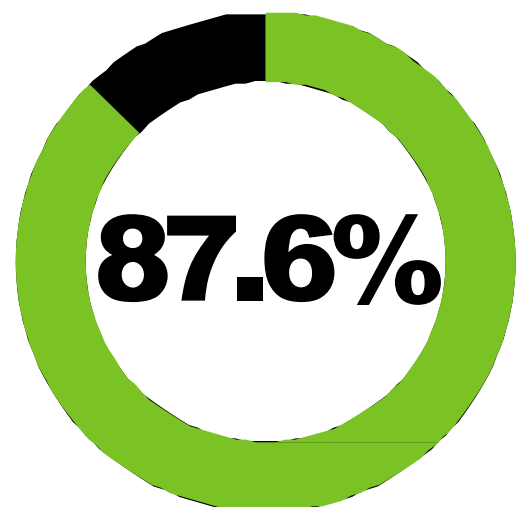
SMART
WATCH USERS



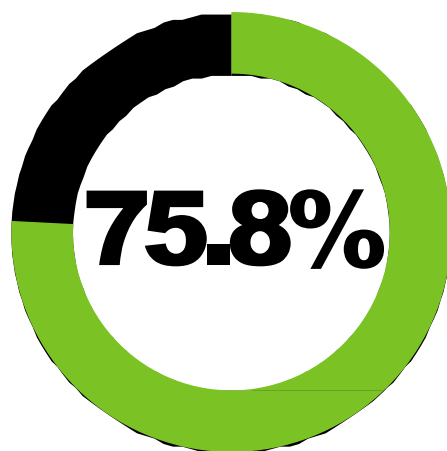
CHARGE MOBILE
PHONE NEARBY
WHEN ASLEEP

“ Almost half of the respondents (46.3%) charge their mobile phones nearby when asleep. This indicates the attitude of handling devices with electromagnetic emission in a less safe environment ”

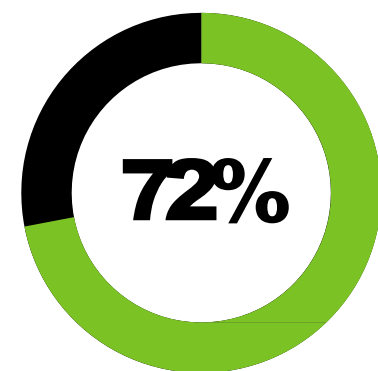
USUAL MOBILE PHONE APPS



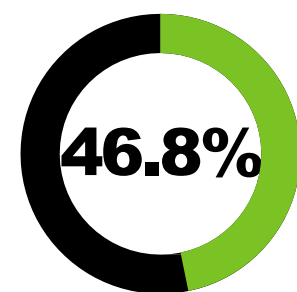
SOCIAL
MEDIA



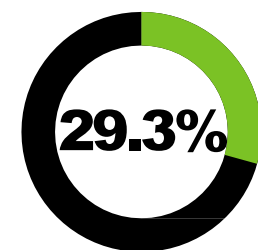
VIDEO
STREAMING



VOICE CALL
USING
WHATSAPP



VIDEO BASED
SOCIAL
MEDIA



ONLINE
VIDEO
GAMES

“ Most of the respondents (>60%) use these applications for less than two (2) hours per day; however, for each application, there were respondents (<9%) spending more than 4 hours daily especially for video streaming application like YouTube and online video games. They may have a higher level of EMF exposure due to prolonged usage times. ”

Perceived Health-related risk from 5G EMF radiation



Mean risk perception score

Can cause headache

3.16

Can cause cancer

3.10

Can impact fertility

2.94

Can harm the foetus during pregnancy

2.93

Can disrupt sleep

2.75

Can cause skin diseases

2.52

Vaccines contain 5G microchips

1.91

Can increase the spread of COVID-19

1.81

Low

(1.00-2.33)

Moderate

(2.34 – 3.67)

High

(3.68-5.00)



Mean risk perception score range and classification

Overall perceived health-related risk is moderate

(Mean: 2.64, SD: 1.34)



The findings may be interpreted as the public is "not sure" of the risk since Scale 3 (somewhat agree) has the highest frequency for all items. However, this provides signs that the public is concerned about the possibility of these risks coming from 5G EMF radiation.



Perceived Health-related risk from 5G EMF radiation vs Objective Knowledge and Attitude



- Objective knowledge can be enhanced effectively by education; hence, it is likely to become a policy target for risk communication efforts in the future. Past studies on the association between objective knowledge and risk perception have shown **mixed results**.
- In our study, respondents who scored **above the mean on objective knowledge** considered EM waves from 5G network base stations as risky as those who scored below the mean.
- When it comes to perceived health-related risk, it is interesting to note that there is **no noted difference** between the respondent of **high objective knowledge** and **low objective knowledge** on 5G emission since the mean risk score for both groups are similar.
- We hypothesised that the attitude of placing a mobile phone charger nearby while asleep would be associated with lower health-related risk perception as the behaviour is suggestive of indifference to exposure to EM waves; however, **no significant relationship was observed**.

TRUST IN PUBLIC POLICIES



76.6%

agree that they **know** that there are **public policies or guidelines** which provide protection from EMF exposure

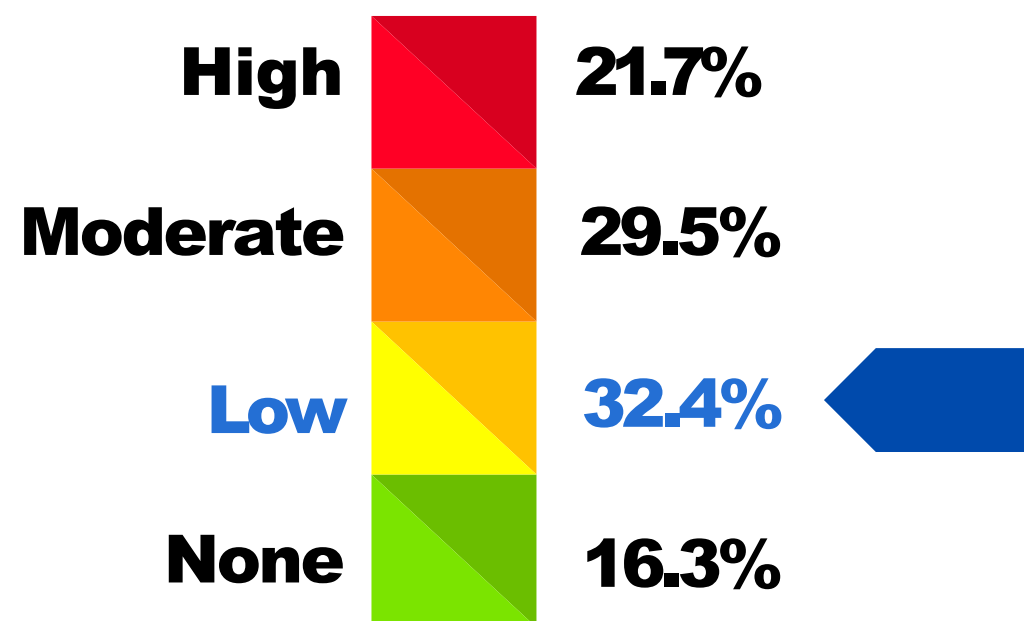
77.1%

believes that public policies provide **protection** from EMF exposure

79.8%

believes that the EMF radiation from the 5G base station and equipment is **within the allowed range**

Malaysian public perceived level on 5G radiation exposure

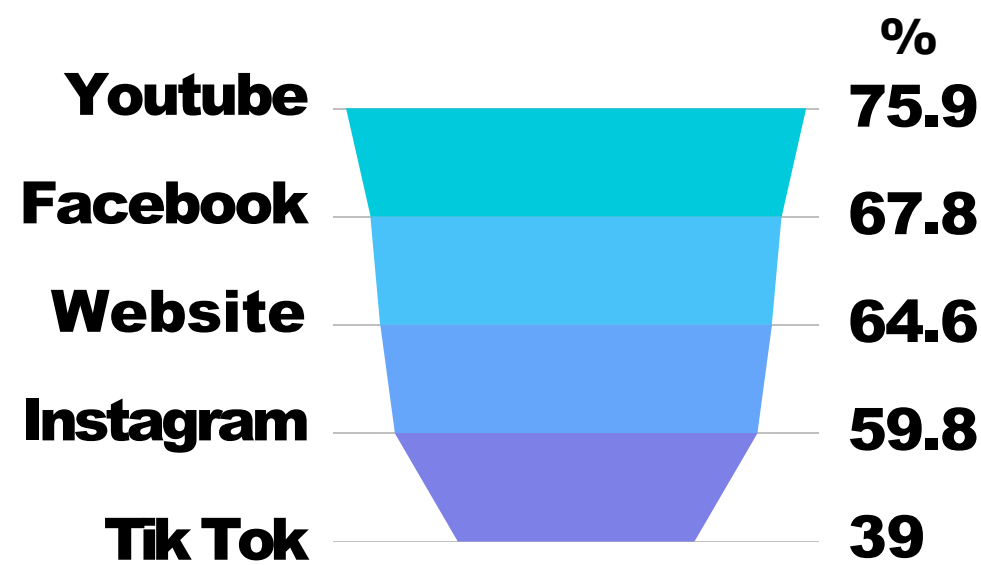


This is a considerably **high degree of public trust** in the policies, despite the concerns the public has about the health-related risk of 5G EMF emissions. This implies that the policymakers (i.e., MCMC) have made good progress in informing the general public regarding the policies developed. However, **those who perceived high 5G radiation exposure are likely to have health concerns about 5G.**

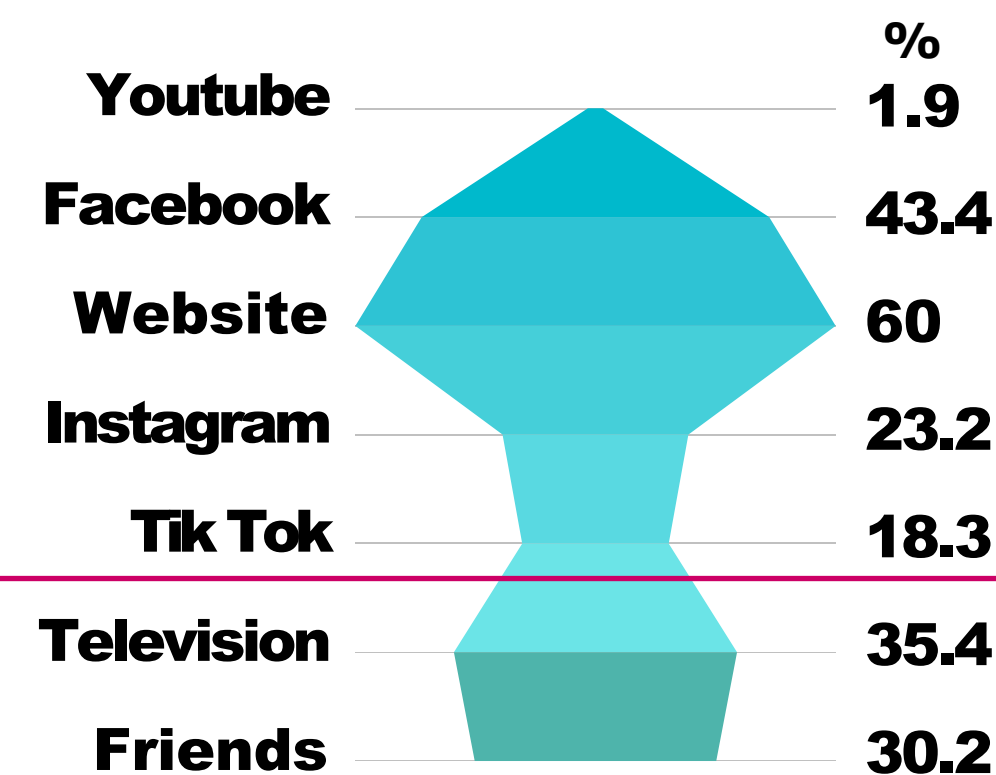


SOURCES OF 5G EMF INFORMATION

Top 5 media platform used in general among Malaysians*



Sources to obtain news on 5G*



* Respondents can choose more than one answer

“

YouTube is not the top source to obtain information about 5G, even though it is the most used platform. In fact, YouTube is the least used source for 5G information. Website and Facebook are the top 2 main sources of 5G news referred by the Malaysian public.

”

Most trusted sources on 5G

58.8%

agree that **both local and international** are the most trusted sources. **International sources (18.3%)** are trusted **more than local sources (9.5%)**

Information reported in media regarding 5G EMF Emission

Trusted

31%

Accurate

28.5%

Easily Understood

27.8%

Current

33.1%

Adequate

24.1%

Reliable

18.8%

% for scale 3-5 (1 = Strongly disagree, 2 = Disagree, 3 = Somewhat agree, 4 = Agree, 5 = Strongly agree)

RECOMMENDATION



Clear Communication of Safety Standards

23% of respondents do not trust the policies developed. Regulatory bodies such as MCMC can **provide accessible and easy-to-understand information** about the established safety standards and how they are enforced.

Independent Research and Studies

Governments such as the Ministry of Higher Education and the Ministry of Health, together with other relevant organisations, can **allocate resources** to fund reputable research institutions to conduct comprehensive studies on the potential health effects of 5G emissions.

Independent Safety Audits

Governments or regulatory bodies can establish procedures to verify compliance with safety standards and conduct **regular audits of 5G networks**. The results of these audits can be made publicly available to demonstrate adherence to safety guidelines.

Continuous Monitoring of Emissions

Implementing continuous monitoring of 5G emissions can provide real-time data on radiation levels and ensure compliance with safety limits. MCMC and network operators **can establish monitoring systems and publicly share** the collected data for transparency.

Health and Safety Awareness Campaigns

To improve the dissemination strategy, MCMC and other agencies like the Ministry of Health **leverage YouTube** as a platform to educate and create awareness on safety measures and thus **provide reliable local information on 5G emissions**.

Public Demonstrations and Showcases

These events allow people to experience the benefits and potential applications of 5G technology firsthand, i.e high-speed downloads, AR, VR, and IoT applications. This is to **balance benefits over concerns** about the health risk of 5G EMF emissions.

- Our study concluded that the degree of perceived health-related risk is “moderate” among the Malaysian public, with many variables being studied as contributing factors.
- All the objectives are achieved with recommendations for relevant agencies, particularly MCMC, the Ministry of Health, higher education institutions, and telecommunication providers, to strengthen public trust towards 5G EMF emission and 5G technology in general.
- It is hoped that the results of our study will be reflected in the construction of an appropriate risk communication strategy in order to allow for a good spread of 5G technologies.
- It is also hoped that this pioneering research will spur more research on 5G EMF emissions, particularly technical research on the health effects and level of exposure that the Malaysian public is experiencing.

ACKNOWLEDGMENT



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THANK YOU

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