

The Pursuit of Health Knowledge

Presenters:

Sanaa Mironov (Undergraduate, UMBC)

Sandesh Timilisina (Masters, UMBC)

Dataset: Health Information National Trends Survey (HINTS5, Cycle 3) [Level 4]

HINTS5 Dataset

BACKGROUND:

- Research conducted by the U.S. National Cancer Institute (NCI)
- Every few years to civilian, non-institutionalized adults in the U.S.

SUMMARY:

- 5247 completed questionnaires and 191 partially completed questionnaires.
- 5438 rows
- 730 features (columns)

To learn about U.S. adults' cancer-related perceptions and knowledge, their health behaviors and their health-related information access, needs, seeking and use.

Approach

Step 1

Read the documentation

- 7 different documents explaining the methodology, webpilot results, and annotated Instrument details.

Step 2

Data Preprocessing

- Removed 371 columns (NCI weighted scale) - not the focus of this work
- Removed all values representing missing values (-9,-7,-5)
- Removed non-numeric values (Eg: explanation for 'if others' field.)

Step 3

Analysis

Dimensionality Reduction

- Reduced similar values to one group in multi-valued features.
Eg: Age, Agree/Disagree scale, Daily/ Never scale, Always/Never scale.

Data Exploration techniques and Machine Learning Models

- Used different classification and regression models.
 - Determine the correlation between the features.
 - Explored the dataset to extract interesting features using different statistical methods.
-

Area of Interest

- How we can use this dataset to extract information about health-related behaviour and how we can make it better.
 - Can we predict human health behaviour?
 - Can we improve health related information seeking behaviour - where and how?
 - Understand the Influence of social and economic factors on health-related behaviour
 - Use the understanding towards sustainability in Health sector
- Why?
- Healthy society is sustainable society.
 - Resources in health sector are under-utilized.
-

Pillars of Sustainability?

- **Social Aspect**

- Do they seek information?
- Where they seek information?
- Influence of electronic devices and social media?
- Are they happy about it?

- **Economic Aspect**

- Does income influence the health behaviour?
- Is there any other aspects of economics.

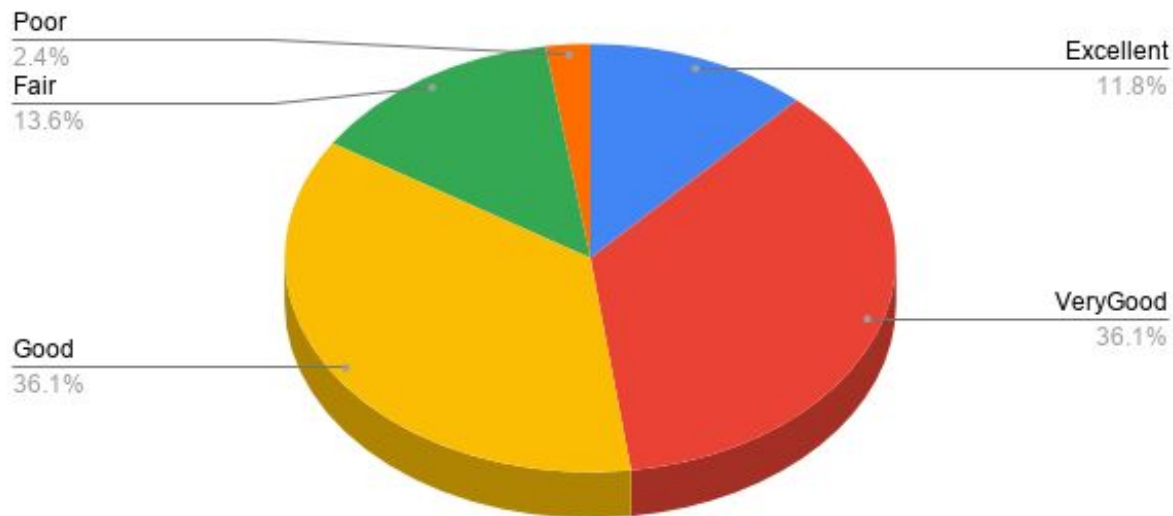
- **Environmental Aspect**

- Dataset did not have features to tell about this aspect
 - What could have been useful?
 - Carbon footprint of health institution/ locality.
 - Pollution level - water, air quality
-

People's' Opinion about their health and its influence on health behaviour

What people think about their health?

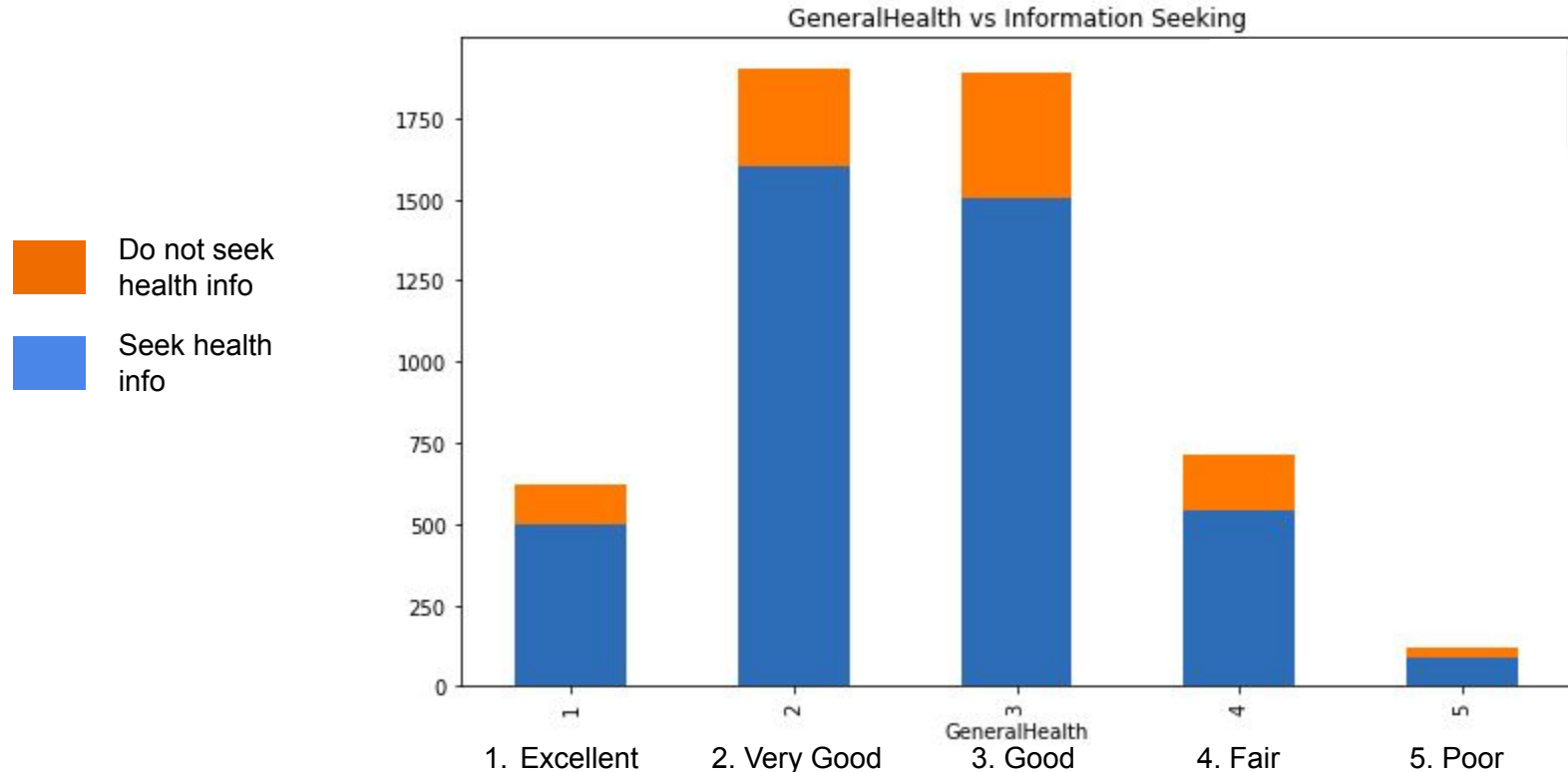
General Health opinion of the people



Observation:

- Majority of the people think that they have **Very Good** or **Good** health.
-

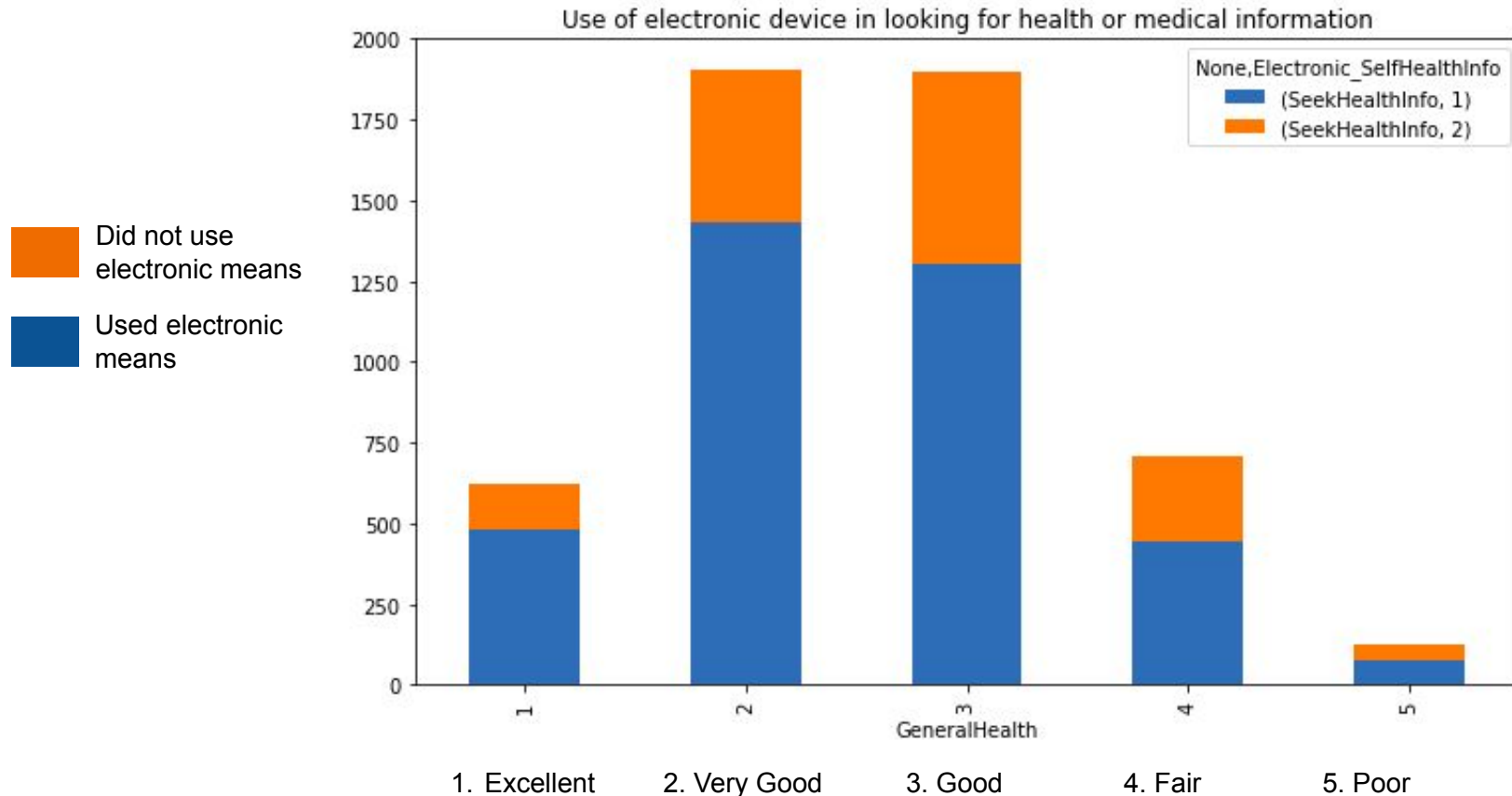
Do people seek health information?



Observation:

- Overall, about 22% of people do not seek health-related information no matter what they feel about their health.
 - 28% of the people who feel that they have Poor health don't seek health information. Reason? - Income?
-

Do people use electronic means to look for health information? - [In past 12 months]

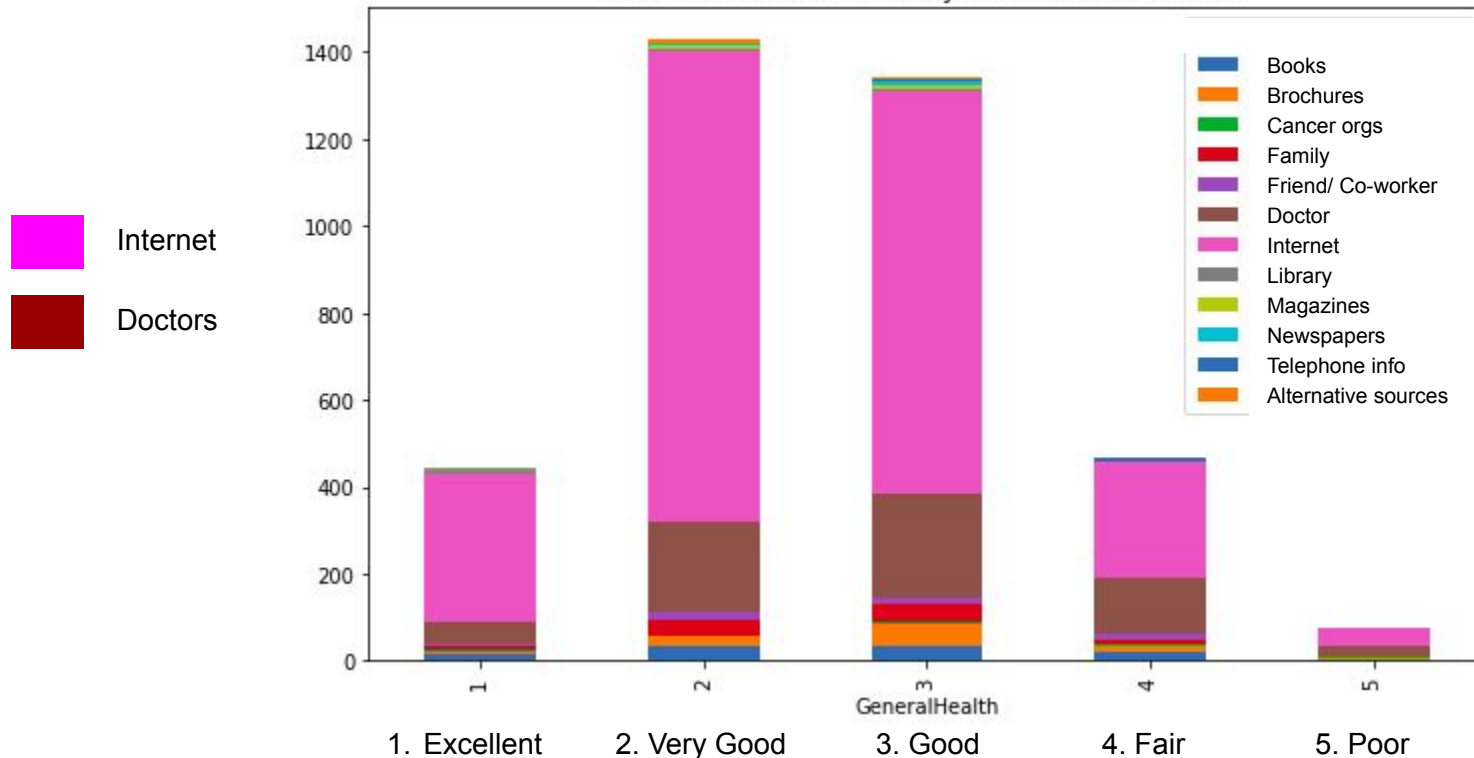


Observation:

- Most people have used electronic means to look for health or medical information for themselves.

Where do they seek information - Generally?

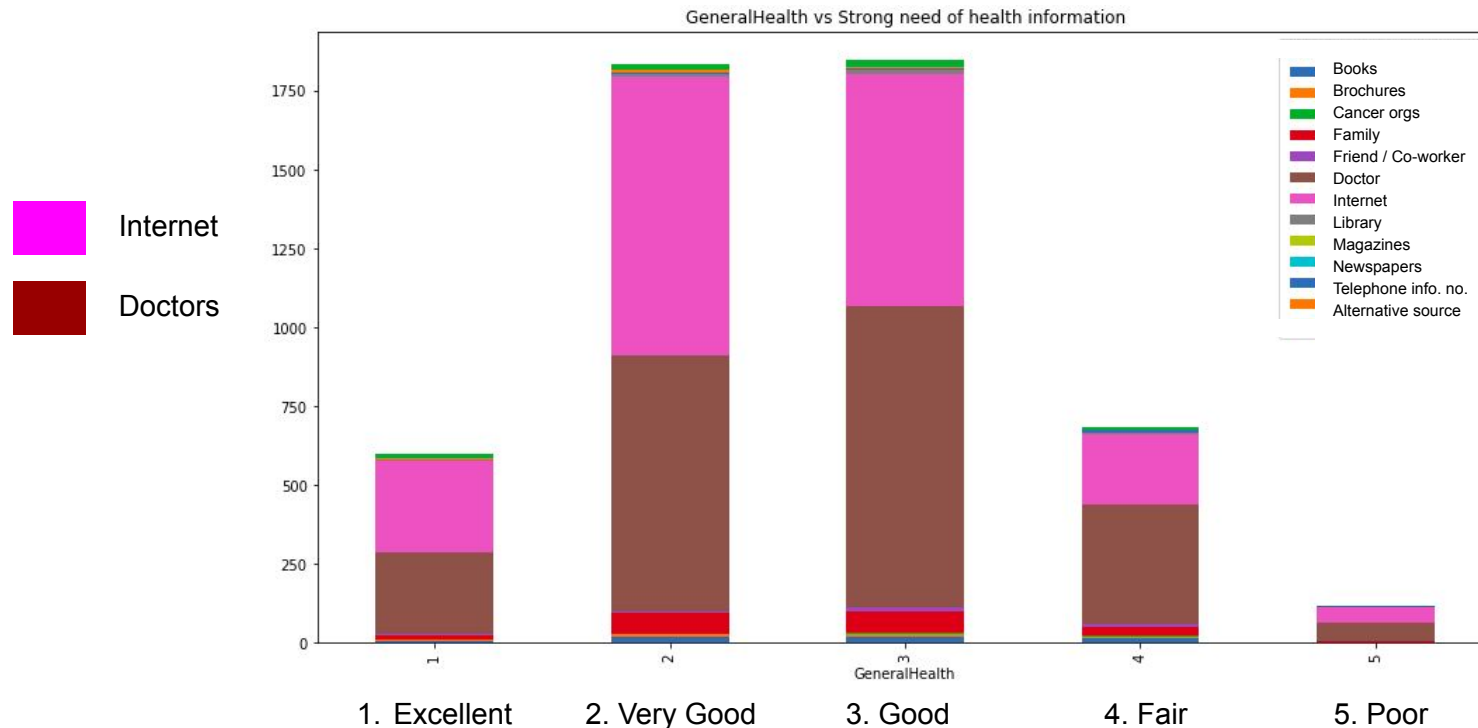
GeneralHealth vs Where they seek health information



Observation:

- In general, people usually look into the **Internet** for health information more than they visit the **Doctors and other health workers**.
- **Mostly used devices:** Mobile devices
- **Location of internet usage:** Workplace (internet usage)

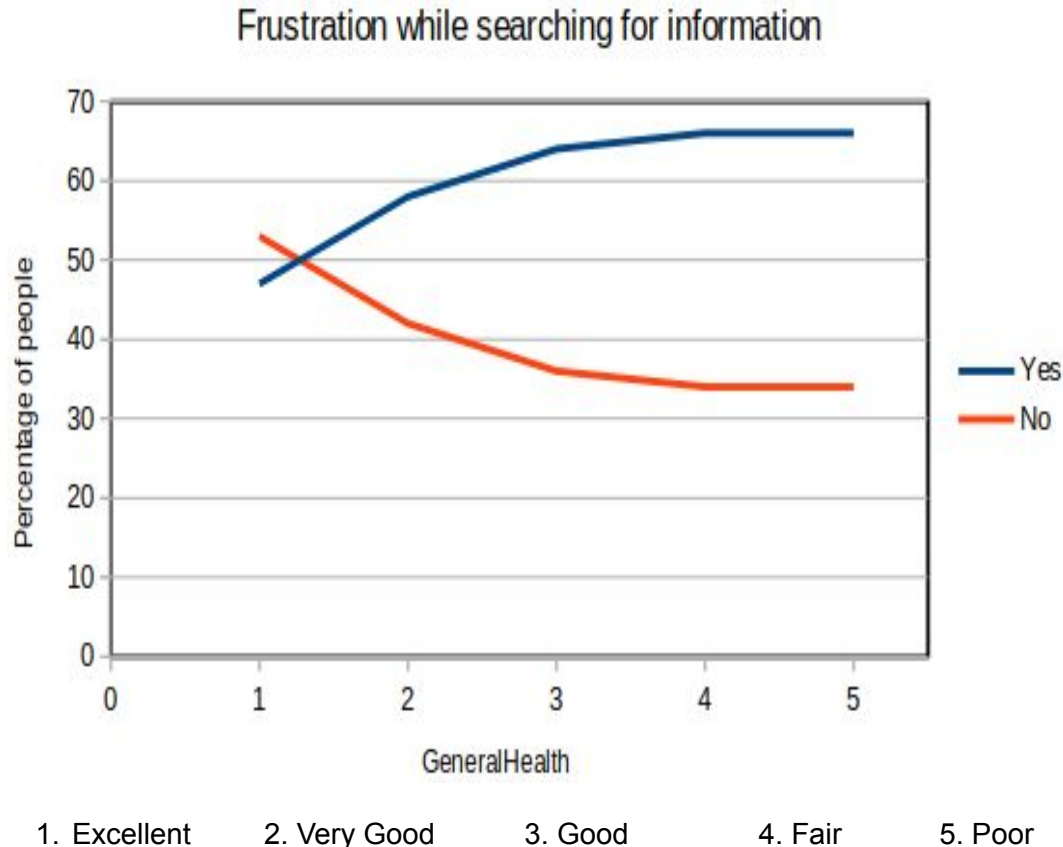
Where - when in strong need of health info?



Observation:

- But, when it comes to critical or strong need to get health information, they trust **Doctors and other health workers** more than **Internet**.
-

Do they feel frustrated when looking for health related information?



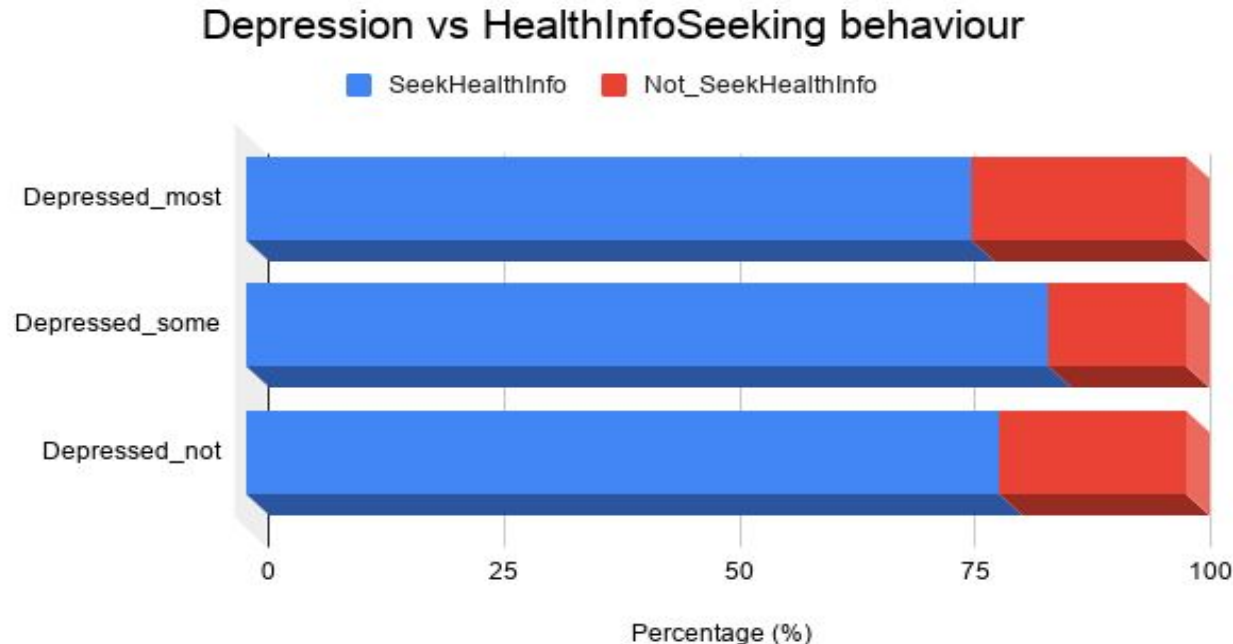
Observation:

- Almost 47% of people who think they have excellent health(1) were frustrated.
- The frustration gradually increases as the general health gradually decreases. The same goes for lots of effort.

Major source of frustration:

Telephone information

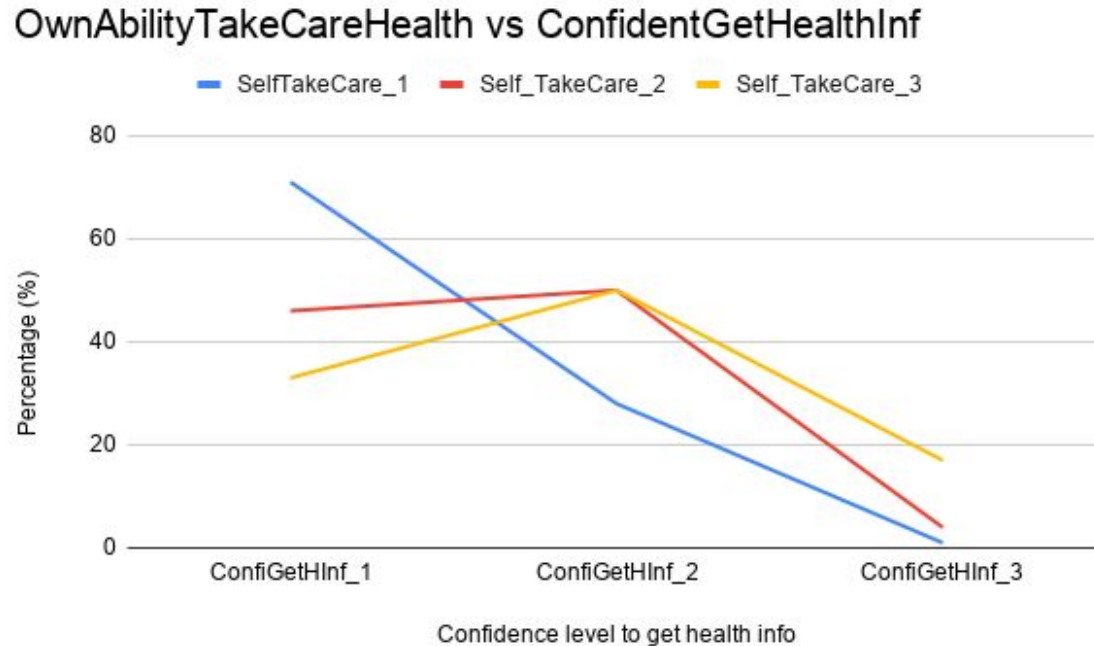
Does Depression/Hopelessness affect Information Seeking? - In past 2 weeks



Observation:

- People who felt depressed/hopeless sometime within past 2 weeks sought more health-related information.
 - People who were depressed most of the time might have been overwhelmed with the amount of resources available. Not able to decide which one to trust.
-

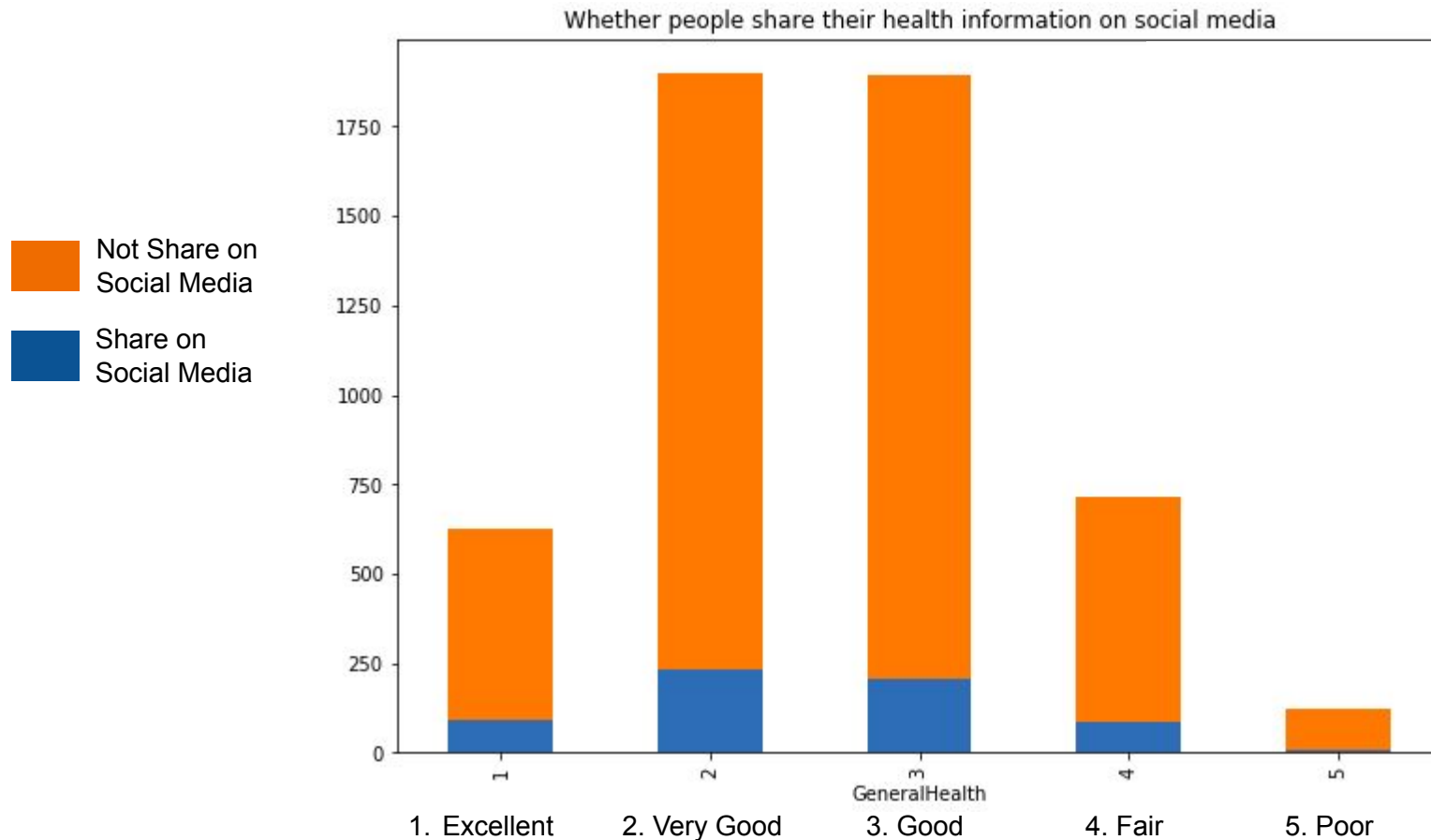
Does Own Ability to Take Care of their Health matters?



Observation: - Yes. It does!!!

- Ability to take care goes down -> confidence to get health information goes down.
 - How do we increase self-efficacy?
 - Find better ways to point out reliable source. [Reliability index]
 - Encouraging peer-groups and discussion groups.
-

Do they like sharing health related information on Social Media?



Observation:

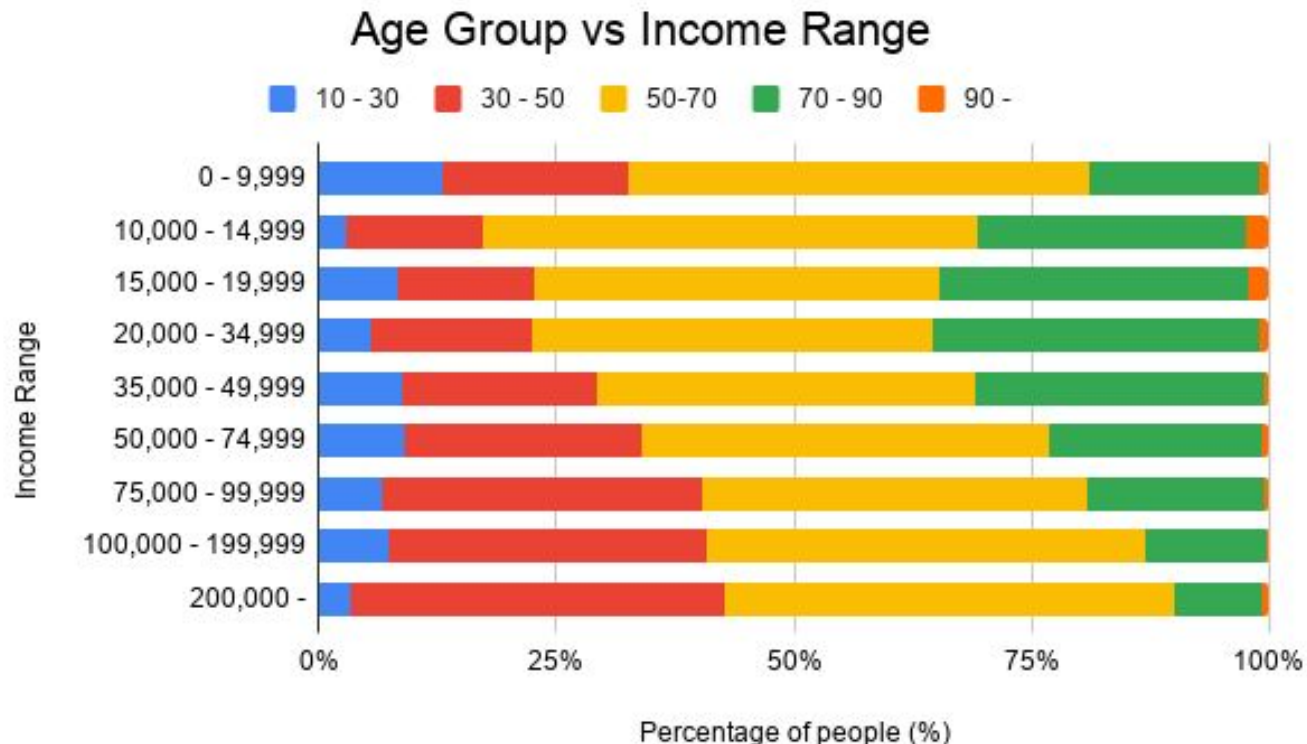
- Very few people like to share their health related information on social media, no matter what they feel about their health.
-

Analysis based on Observation:

- Most of the people believe that they have **good health in general**. This means that they don't have any diseases that they know of.
 - People still **trust doctors** and other health care workers no matter how advanced the internet or technology has become.
 - **Looking for health related information in workplace** means that people, in general, don't like to share their health issues even with their family members. Majority of the day is spent at work.
 - People try to get health related information on their own. But the information available makes it **difficult to filter out the relevant and reliable sources**.
 - **Self efficacy matters** when it comes to **health related information seeking**.
 - People love using social media platform for different purposes but sharing **personal health information** is not among them.
-

Economic Aspects of Health Seeking Behavior

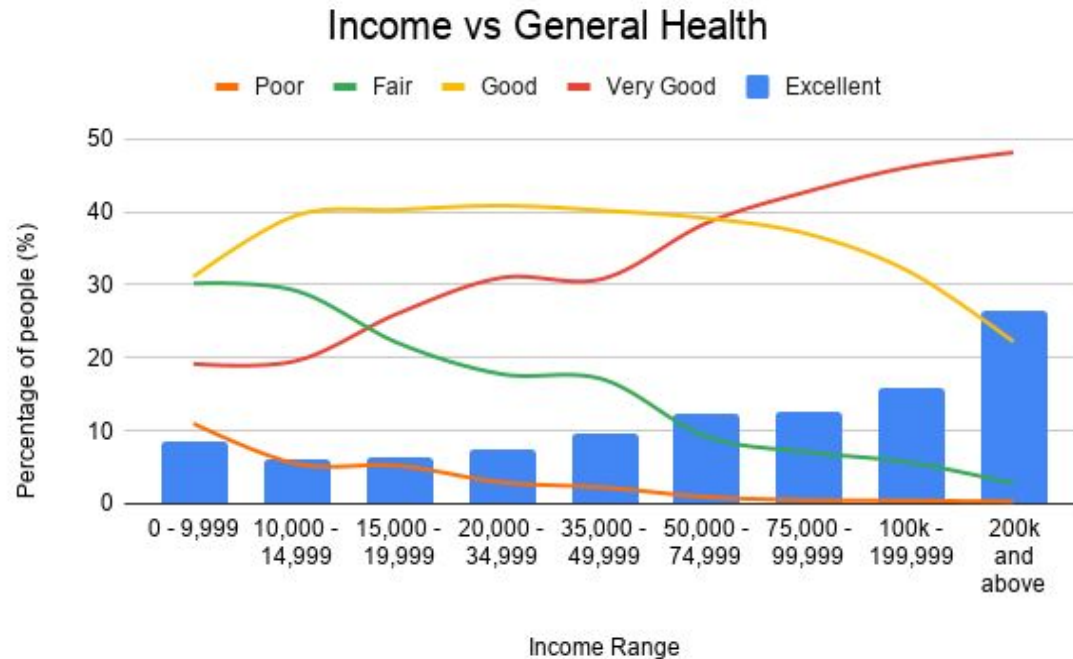
Does Age affects Income?



Observation: - Yes. It does!!!

- Working age groups **30-50** and **50-70** had higher income compared to other age groups
 - Reasons
 - Work more -> earn more
-

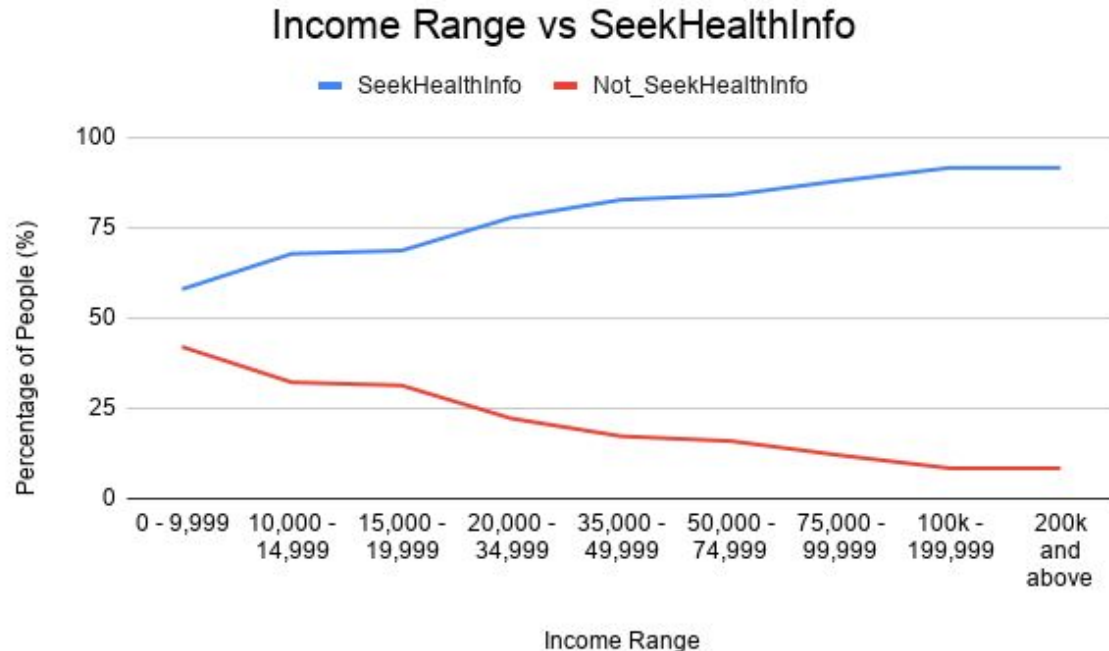
Does Income affects General Health opinion?



Observation: - Yes. It does!!!

- The percentage of people who reported **Excellent** and **Very Good** health increased with the increase in income.
 - Reasons
 - Higher self confidences and better access to health care and treatment.
-

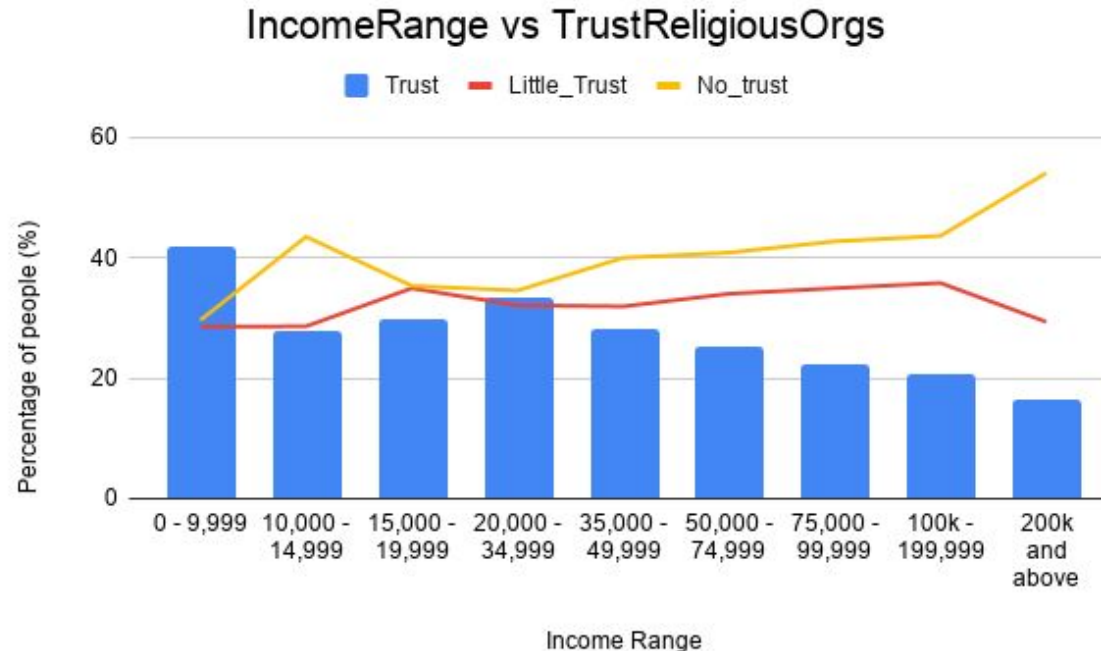
Does Income affects Health Information seeking?



Observation: - Yes. It does!!!

- Higher the income -> Higher their desire to seek health related information.
 - Reasons
 - Higher income people believe that they can afford the treatment if there is something wrong.
-

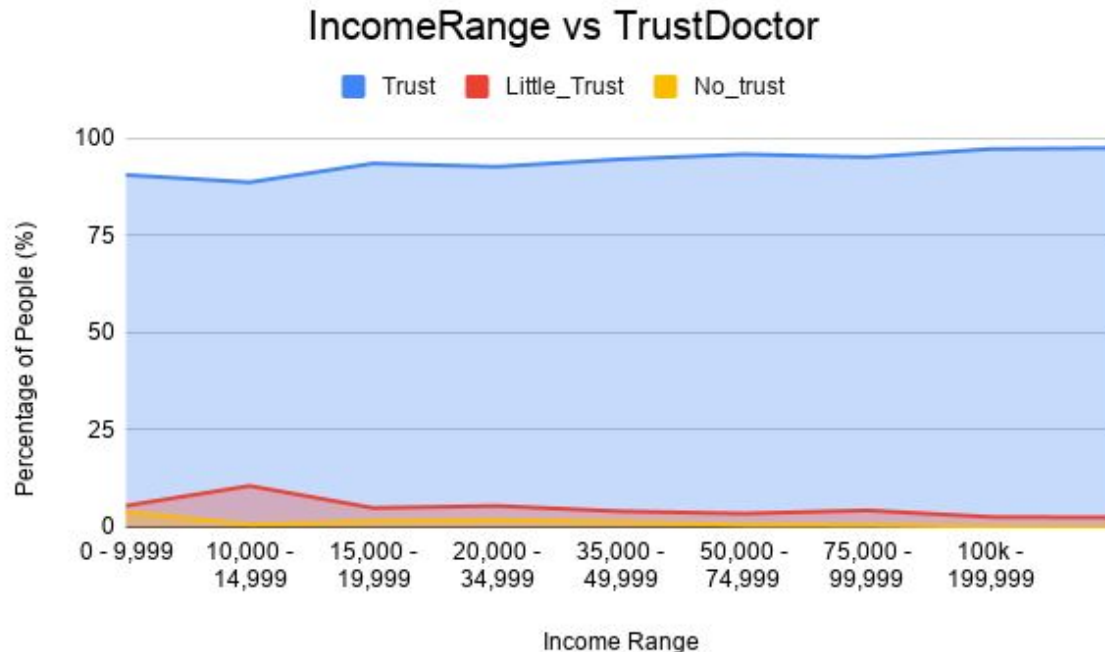
Does Income affects People's Trust in Religious Orgs for Health related Information?



Observation: - Yes. It does!!!

- Higher the income -> Lower the trust over Religious organization for health information.
 - Income Range **10,000 - 14,999** is an **anomaly**.
-

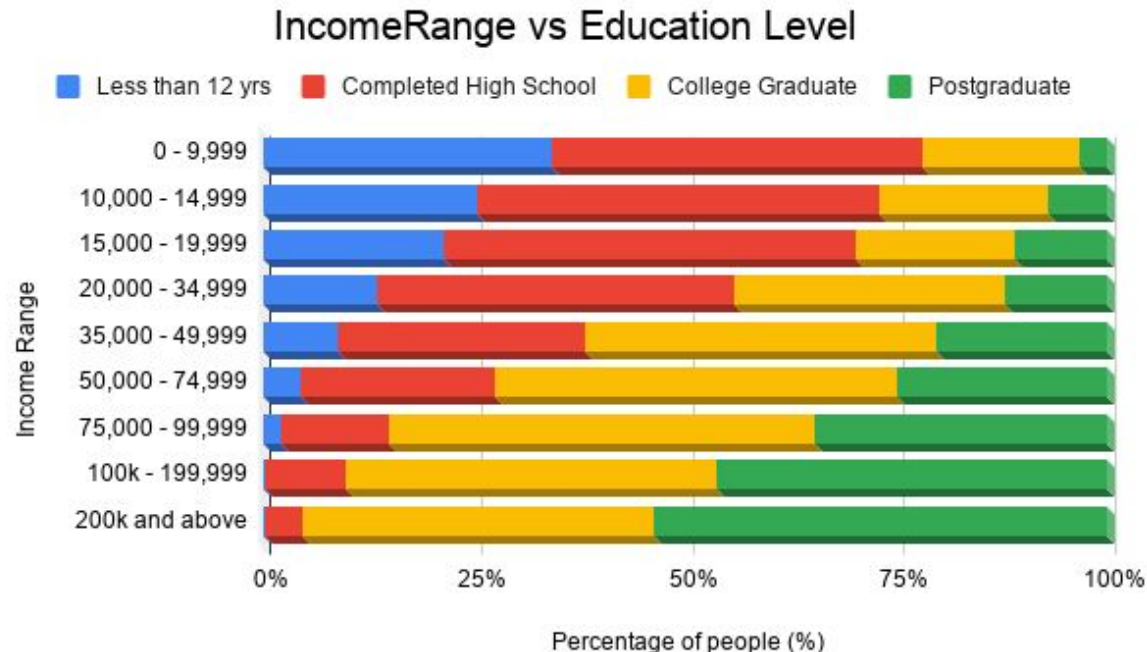
Does Income affects People's Trust in Doctor for Health related Information?



Observation: - Yes. It does!!!

- Trust in doctor increases slightly as the income range increases.
 - Income Range **10,000 - 14,999** is an **anomaly**.
-

Reason? - Education Level



Observation:

- As income range increases, people value education more and more.
 - This likely makes people aware that Health Workers/Doctors are well equipped and knowledgeable than Religious orgs in terms of health related information.
-

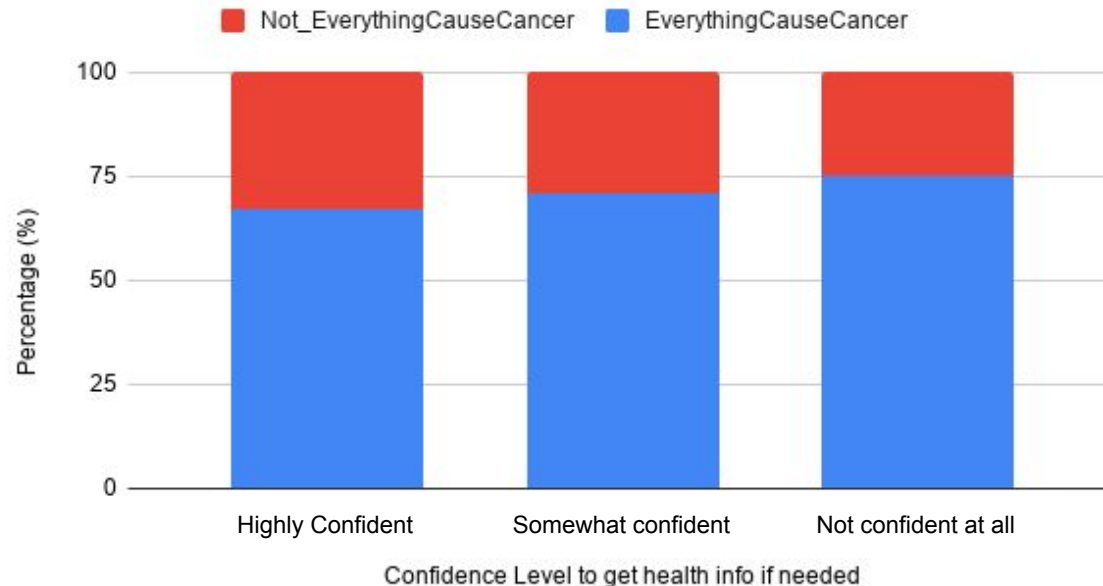
Analysis based on Observation:

- Person's income influences their health related behaviour and information seeking.
 - People with higher income believe that they have better health. This might be because people with higher income can spend more on health care and do regular health check-ups.
 - People with higher income tend to seek more health related information. The likely reason is the higher self-esteem and belief that they can achieve a positive outcome by an informed action.
 - Lower Income families and individuals trust Religious Orgs more for health related information as they are less educated and have less money for insurance, medical care and treatment.
 - Higher income family/individuals spend more money on health care and hence seek health treatments from qualified health workers.
 - Income and Education level are correlated. As one increases so does the other.
-

Analysis of Cancer

Does Everything Cause Cancer?

ConfidentGetHealthInf vs EverythingCauseCancer

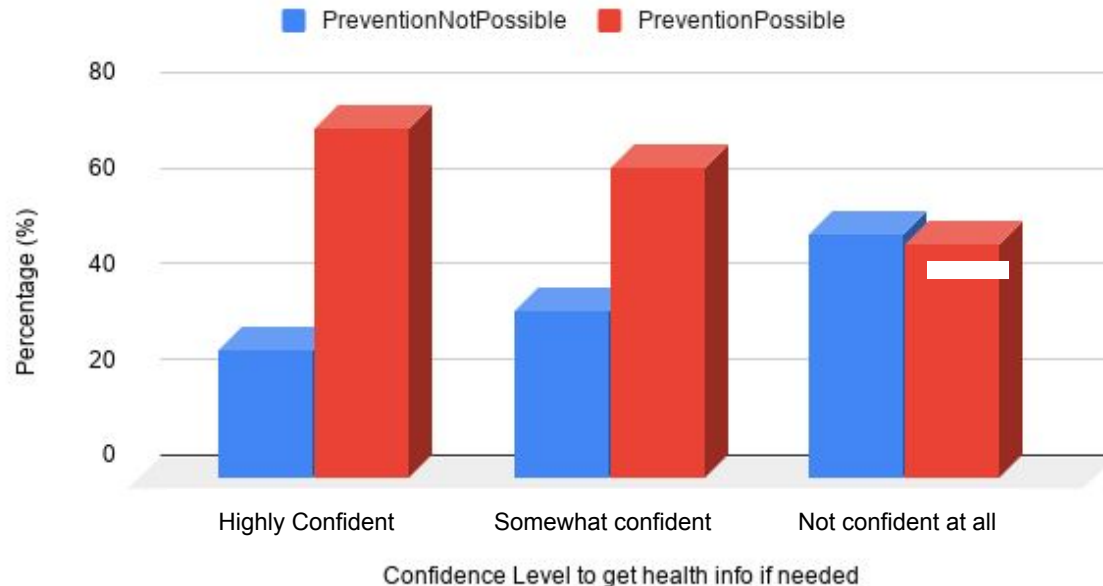


Observation:

- People who are less confident about whether they can get health related information in need are more likely to believe that everything causes cancer.
 - Once you start figuring out information, people realize not everything causes cancer.
-

Is Cancer Prevention Not Possible?

ConfidentGetHealthInfo vs PreventionNotPossible

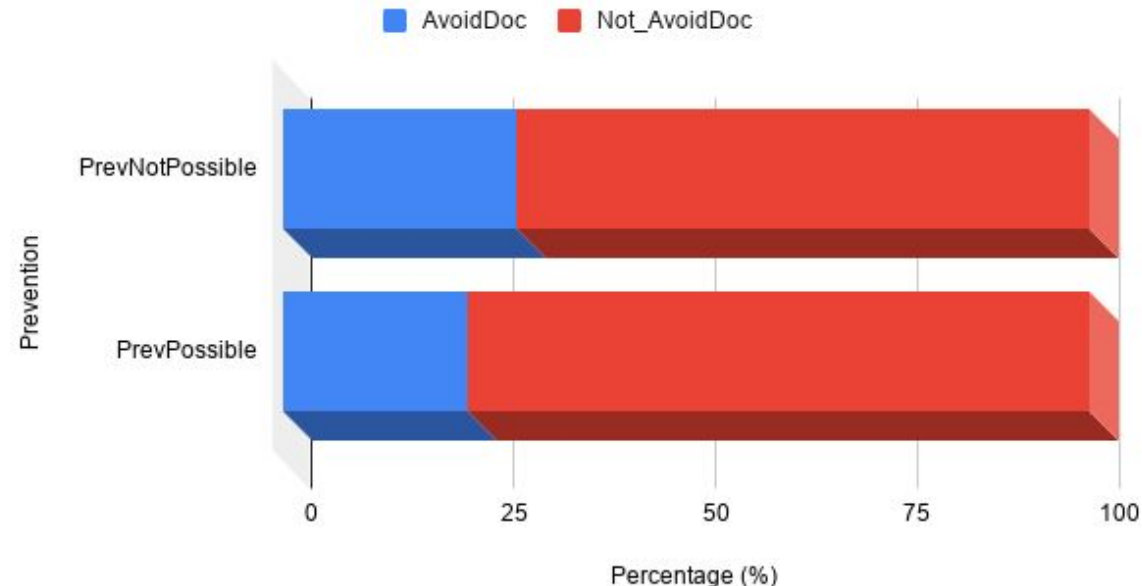


Observation:

- High confidence to get needed health information -> believe Prevention is possible.
-

Does PreventionNotPossible lead to AvoidingDoc?

Does PreventionNotPossible lead to AvoidingDoc?



Observation:

- People who believed Prevention is not possible avoided doctors more.
 - People who believed that Cancer prevention is possible also avoided Doctors. This might be because of financial issue.
-

Analysis based on Observation:

- Self-confidence is considered one of the most influential motivators and regulators of behavior in people's everyday lives.
 - Self-confidence increases with education and income.
 - Self-confidence translates into relying on healthcare professionals rather than religious organizations for health knowledge.
 - As people's self-confidence decreases, their outlook on life and disease prevention decrease.
 - Motivation to seek health knowledge decreases with the decrease in perceived self efficacy, i.e. with the perceived inability to use the information to improve health prospects.
 - Everyone turns to the Internet for health knowledge first, except individuals with an immediate and apparent health problem.
 - The absolute majority of the surveyed individuals avoid doctors, regardless of all other factors.
-

Summary

- Most people use the Internet as the primary source of health-related information.
- People who are more likely to seek health-related information are well-off, well educated, confident, and slightly depressed.
- Self-confidence, the belief that a person can achieve better health by self-directed action, is the leading factor motivating people to seek health-related knowledge.
- Offering reliable educational online resources for motivated individuals would be the most effective and sustainable way of improving the individual health-related behavior.

We can influence the health related information seeking of the people by monitoring the current health behaviour and motivating people to seek for reliable health information.

Thank You
