The *Overcoming Vaccine Hesitancy in Hong Kong* Project
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Design Effective Vaccine Communication Messages Using Audience Segmentation

1. Research Background and Goal

Since different audience groups have different communication needs, a communication campaign cannot successfully appeal to all people in the same way. Research on campaign effectiveness shows that audience segmentation is essential in campaign and intervention design (Maibach et.al., 2006; Slater, 1996). Audience segmentation is the process of dividing a large heterogeneous population into groups of individuals who share similar characteristics and react similarly to communication effort (Lee & Kotler, 2019; Smith, 2017). Therefore, analysing differences in communication needs across audience subgroups can help policymakers and campaign planners design and deliver more tailored persuasive messages for stronger connections with different groups of target audience.

In the case of vaccine communication campaign design, using the same message and persuasive appeal are unlikely to work for all people. An effective vaccine communication campaign must be audience centred. Therefore, to achieve success in vaccine promotional campaign, it is also important to design tailored message contents and to select persuasive appeals that can address the concerns, needs, and perspectives of specific audience segments. Furthermore, segmentation provides the basis to select communication channels for reaching out to different audience segments more efficiently. To provide practical guidelines to design effective vaccine communication campaign messages for different target audience segments, the goal of this study is to identify the differences in communication needs and channel usage across three audience sub-groups: the CoronaVac vaccine takers, the BioNTech vaccine takers, and non-takers.

2. Research Questions

Two major research questions of this study include:

1. Was there any difference in communication needs across the CoronaVac takers, the BioNTech takers, and non-takers?
2. Was there any difference in the use of communication channels across the three audience sub-groups?

3. Methods

The target population of this study were Hong Kong residents ranging from the age of 18 to 65 or older who are literate in Chinese. A cross-sectional online survey was conducted from late May 2021 to early June 2021. A purposive sampling was employed to select unvaccinated people (either not been vaccinated or decided not to be vaccinated). The participants were recruited through an online panel managed by a Hong Kong based market research firm. A total of 1,134 valid responses were recorded in this study that the respondents took around 25 minutes to complete the survey.

4. Major Findings

Major differences in communication need and communication channel usage were observed across the three audience subgroups: the CoronaVac vaccine takers, the BioNTech vaccine takers, and non-takers. The results are presented below:

4.1 Difference in communication needs

4.1.1. CoronaVac takers (see Table 1)

- The CoronaVac takers felt greater extent of pride about their decision on being vaccinated than the BioNTech takers.
- CoronaVac takers perceived greater benefits of the vaccination for the following reasons:
    - Vaccination helps alleviate mental stress related to COVID-19 pandemic (e.g., reduce anxiety about COVID-19, and set people's mind at ease).
    - Vaccination helps me get approval from others (e.g., family, friends, employers, people who are important to them).

Table 1: Difference in ccommunication needs across the three audience sub-groups (1)

	F (2, 1131)	*P value*	CoronaVac takers	BioNTech takers	Non-Takers

			M(*SD*)	*M*(*SD*)	*M*(*SD*)
The extent of pride in their vaccination decision	214.08	$p < .001$	3.73 (1.05)	3.25 (0.99)	2.13(1.10)
Vaccination helps alleviate mental stress related to COVID-19 pandemic	80.94	$p < .001$	3.78 (0.90)	3.49 (0.84)	2.91 (0.98)
Vaccination helps me get approval from others	103.73	$p < .001$	3.79 (0.89)	3.44 (0.89)	2.79 (1.00)

Note: M=Mean, SD=Standard Deviation.

4.1.2. BioNTech takers

- BioNTech vaccine takers perceived less severe side effects than CoronaVac takers and non-takers (see Table 2).

Table 2: Difference in communication needs across the three audience sub-groups (2)

	F (2, 1131)	*P value*	BioNTech takers	CoronaVac takers	Non-Takers
			M(*SD*)	*M*(*SD*)	*M*(*SD*)
Perceived severe side effect risk	46.12	$p < .001$	2.65 (1.03)	2.96 (1.34)	3.47 (1.10)

Note: M=Mean, SD=Standard Deviation.

4.1.3. Non-takers

- Non-takers were more vulnerable to omission bias than vaccine takers. That is, non-takers considered the risk of harm caused by vaccination as more negative than the risk of harm caused by no vaccination (Asch et al., 1994; Ritov & Baron, 1990) (see Table 3).
- Non-takers perceived greater likelihood to experience side effects and felt more worried about the side effects than the vaccine takers (see Table 3).
- Non-takers also perceived greater drawbacks of vaccination (see Table 3):
    - Vaccination poses threats to physical health (e.g., vaccine may cause adverse side effects or complications).
    - Vaccination causes disruptions to my daily life and work (e.g., take a leave after vaccination in case of side effects, and be unable to focus on work if experiencing side effects).
    - There are too many uncertainties related to COVID-19 vaccines (e.g., the vaccines are developed and have been used for a short period of time; there might be unknown side effects or risks; understanding about the vaccines is lacking; and there is insufficient scientific evidence to make people feel confident about vaccination).
    - The effectiveness of the COVID-19 vaccines remains uncertain (e.g., the extent of protection against the COVID-19 virus and its variants, and how long the protection will last).
- Vaccine takers had higher confidence in the two vaccines than the non-takers (see Table 4).
- The non-takers perceived a greater need for vaccine information than BioNTech vaccine takers (see Table 3).

Table 3: Difference in communication needs across the three audience sub-groups (3)

	F (2, 1131)	*P value*	Non-Takers	CoronaVac takers	BioNTech takers
			M(*SD*)	*M*(*SD*)	*M*(*SD*)
Vulnerability to omission bias	96.08	$p < .001$	12.55 (2.50)	10.48 (2.74)	9.98 (2.58)
Perceived likelihood of experiencing side effect	130.47	$p < .001$	0.99 (0.11)	0.69 (0.47)	0.75 (0.43)

Anxiety about side effect		55.78	$p < .001$	4.08 (0.98)	3.36 (1.11)	3.48 (0.91)
Drawbacks of vaccination	Threats to physical health	19.59	$p < .001$	3.88 (0.88)	3.48 (1.02)	3.59 (0.80)
	Disruptions to daily life and work	9.79	$p < .001$	3.43 (0.89)	3.15 (1.15)	3.18 (1.03)
	Uncertainties related to COVID-19 vaccines	38.21	$p < .001$	3.88 (0.90)	3.39 (0.95)	3.34 (0.86)
	The uncertain effectiveness of the COVID-19 vaccines	20.25	$p < .001$	3.76 (0.87)	3.41 (1.08)	3.34 (0.95)
Need for vaccine information		3.11	$p < .05$	3.51 (0.98)	3.42 (1.04)	3.29 (0.90)

Note: M=Mean, SD=Standard Deviation.

Table 4: Difference in communication needs between vaccine takers and non-takers

	t (705.13)	*P value*	Takers	Non-takers
			M(*SD*)	*M*(*SD*)
Confidence in the two vaccines	-19.36	$p < .01$	3.59 (0.76)	2.63 (0.81)

Note: M=Mean, SD=Standard Deviation.

4.2 Difference in communication channel usage

4.2.1 Channel use of the CoronaVac takers

- CoronaVac takers paid more attention to health-related information from the following channels than BioNTech takers and non-takers (see Table 5):
  - Blogs and online discussion forums
  - Mobile apps (including news, healthcare or other apps)
  - Telephone hotline
- They also had a higher level of trust in health-related information from the following channels than that of BioNTech takers and non-takers (see Table 6):
  - Social media (e.g., Facebook and Instagram)
  - Instant messaging platforms

4.2.2 Channel use of the BioNTech takers

- BioNTech takers paid more attention to health-related information provided by doctors or health care providers than non-takers (see Table 5).
- BioNTech takers also had higher level of trust in health-related information provided by doctors or health care providers than CoronaVac takers (see Table 6).

4.2.3 Channel use of the non-takers

- Of all the communication channels, non-takers relatively paid more attention to vaccine information provided by doctors or healthcare providers and interpersonal channels including family, friends, employers and colleagues (see Table 7).
- Non-takers relatively placed more trust in the information provided by doctors or healthcare providers (see Table 7).

Table 5: Respondents' attention paid to health-related information on different channels

	F (2, 1131)	*P value*	CoronaVac Takes	BioNTech Takers	Non-takers
			M(*SD*)	*M*(*SD*)	*M*(*SD*)
Blogs and online discussion forums	27.27	$p < .001$	3.41 (0.98)	3.03 (0.98)	2.88 (0.93)

Mobile apps (including news, healthcare or other apps)	9.78	$p < .001$	3.41 (0.93)	3.16 (0.88)	3.09 (0.94)
Telephone hotline	37.44	$p < .001$	3.29 (1.01)	2.86 (0.91)	2.66 (0.95)
Doctors or health care providers	5.14	$p < .01$	3.81 (0.97)	3.83 (0.82)	3.63 (0.90)

Note: M=Mean, SD=Standard Deviation.

Table 6: Respondents' level of trust in health-related information from different channels

	F (2, 1131)	*P value*	CoronaVac Takes	BioNTech Takers	Non-takers
			M(*SD*)	*M*(*SD*)	*M*(*SD*)
Social media (e.g., Facebook and Instagram)	26.60	$p < .001$	3.40 (1.04)	2.95 (0.70)	2.97 (0.71)
Instant messaging platforms (e.g., WhatsApp and, Wechat)	22.70	$p < .001$	3.23 (1.01)	2.93 (0.73)	2.83 (0.72)
Doctors or health care providers	3.58	$p < .05$	3.95 (0.86)	4.16 (0.82)	4.09 (0.76)

Note: M=Mean, SD=Standard Deviation.

Table 7: Channel use of the non-takers

	M	SD
Non-takers' attention paid to vaccine information provided by doctors or healthcare providers	3.63	0.90
Non-takers' attention paid to vaccine information provided by interpersonal channels including family, friends, employer and colleagues	3.43	0.82
Non-takers' trust in the information provided by doctor or healthcare providers	4.09	0.76

Note: M=Mean, SD=Standard Deviation.

5. Implications

The findings of this study revealed differences in communication needs and communication channel usages across the three audience sub-groups of the CoronaVac vaccine takers, the BioNTech vaccine takers, and the non-takers. To design more tailored message contents and to reach out to each of the audience segments, we make the following recommendations on communication strategy design and selection of communication channels.

5.1. Communication strategy design recommendations

- To effectively persuade non-takers to get vaccinated, strong arguments regarding the potential side effects along with data and facts should be emphasised in the campaign messages.
- To design campaign message to non-takers, the message should emphasise the effectiveness of the vaccines to prevent COVID-19 and its virus variants.

- To work against the effect of omission bias, campaign messages for non-takers should emphasise that the harms caused by non-vaccination are greater than those caused by vaccination. Campaign messages may also emphasise that the benefits of vaccination are greater than its costs.
- When designing messages related to CoronaVac vaccine, the persuasive appeal of pride is likely to be effective as the persuasive strategy.
- To design campaign messages related to CoronaVac vaccine, emphasis should be placed on the benefits of vaccination in campaign messages such as getting approval from significant others (e.g., spouse, parents, employers and closer friends) and reducing anxiety.
- When designing messages related to BioNTech vaccine, endorsement from health professionals should be used in campaign messages.

5.2. Reaching out to different groups of target audience

- To deliver CoronaVac vaccine-related messages, the following channels are likely to be more effective:
  - Mobile apps (including news, healthcare or other apps)
  - Telephone hotline
  - Social media (e.g., Facebook and Instagram)
  - Instant messaging platforms (e.g., WhatsApp and WeChat)
  - Blogs and online discussion forums
- To deliver BioNTech vaccine-related messages, professional interpersonal channels such as physicians and nurses are more likely to be effective.
- To reach out to the non-takers, vaccine-related messages should be delivered via interpersonal channels such as healthcare professionals as well as family, friends, employers and colleagues.

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