The voice of people's perspective on the future of health resilience post pandemic hits: a numerically scaled survey in 19 provinces in Indonesia

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Abstract. For a very long time, Indonesia's health resilience has struggled with a shortage of sufficient demographic statistics. This will impede the creation of practical plans for allocating resources wisely and assessing public health initiatives. In order to address the present and upcoming health concerns, expanding databases on previous pandemics is essential. The purpose of this study is to investigate the perspective of Indonesians regarding previous pandemics that have impacted the country's health security. This study was conducted using a cross-sectional design. An overall total of 224 Indonesian people from 19 provinces completed a numerically scaled survey. According to our one-way ANOVA with Games-Howell's multiple comparisons for the ten variables under observation, people tended to position themselves in fully supporting forms as both self- and government-trusting. On the other hand, they were against ignorance and pessimism towards the government's handling of the pandemic. Instead, they favoured acting on their own free will to defend themselves without making needless motions. Overall, our data show that people are optimistic and confident in health resilience at the national level because they are aware of how to manage pandemics, and they have faith in the government to handle health crises.

1 Background

Indonesia, like many other countries, faces challenges in managing health resilience due to inadequate data on its citizens [1]. On the other hand, accurate and comprehensive data is crucial for policymakers and health officials to develop effective strategies, allocate resources, and monitor progress. Without sufficient data on the population's health status, needs, and distribution, it is difficult to allocate resources efficiently, which might lead to underserved or overserved areas, which may result in inadequate healthcare access for some citizens [2,3]. Lack of data makes it difficult to pinpoint the areas and demographics requiring

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targeted interventions, leading to less effective health programs [3]. More importantly, without proper data, it is challenging to measure the effectiveness of interventions and make data-driven decisions for future strategies [4,5]. Therefore, we see the need of Indonesia—the world's top fourth most populated country—strengthening its database on population perspectives on the past pandemic. Understanding public sentiment and experiences during the pandemic can help policymakers and health officials tailor their strategies to better address the needs and concerns of the population. This can improve the effectiveness of public health interventions and increase public trust in the government's response to the crisis. By learning from past experiences, Indonesia can identify potential challenges and opportunities, enabling them to prepare and respond more effectively to the ongoing COVID-19 pandemic and any future health crises. Lastly yet most paramount, having a robust database on population perspectives can help researchers and scholars study the socio-economic and psychological impacts of pandemics. This absence of this database makes it difficult to design future policies and programs aimed at reducing the negative impact of the pandemic on individuals and society. The present study aims at investigating the perspective of Indonesians across provinces on the past pandemic and how this projects the health resilience at a national level. We distributed numerical-scaled survey in such a way that we would be having representative for each province in Indonesia. Despite the study being held nationally, we believed that this also projected the global perspective with explainable disparity. By disseminating our results, we intend to broaden our horizon in understanding how these citizens see their nation and how they extent their trusts upon the government's role as the ultimate navigator for this overall health-associated intervention strategies.

2 Literature Review

Data refers to facts, figures, statistics, or information that can be collected, processed, and analyzed to reveal patterns, trends, or relationships [6]. It is the raw material that drives insights, knowledge, and decision-making in various domains, including healthcare, economics, social sciences, and technology [7]. The importance of data lies in its ability to provide a structured and quantifiable understanding of the world around us. Data serves as the backbone for making informed decisions, as it provides a solid foundation for understanding the current state of affairs, identifying patterns, and predicting future outcomes [8,9]. It helps in identifying problems, understanding their root causes, and developing targeted solutions to address them effectively [10]. Thus, it is essential for policymakers to understand the impact of their decisions and develop evidence-based policies that benefit the public [11].

Having data on citizen perspective during previous outbreak pandemics is of utmost importance for several reasons. This information can be instrumental in refining future plans to better address the needs and concerns of citizens [12,13]. Secondly, tracking citizens' perspectives allows for the timely identification of misinformation and rumors, enabling authorities to counter them with accurate information and maintain public trust [14,15]. Lastly, by analyzing citizen feedback, governments can foster a sense of inclusion and transparency, which can significantly improve their relationship with the public and encourage cooperation during difficult times. In essence, data on citizen perspective in pandemic situations is crucial for effective decision-making, building trust, and ensuring a more resilient society in the face of future outbreaks [16–19].

One of the best methods to gather data on citizen perspective is through the use of surveys [20,21]. Surveys can be designed to target specific aspects of the pandemic, such as the effectiveness of government responses, the impact on mental health, or the adoption of preventive measures like vaccination and social distancing. By collecting responses from a diverse and representative sample of the population, surveys can provide a comprehensive

understanding of the citizen perspective [22,23]. Due to its many benefits, surveys are widely used, particularly in positivist quantitative research since they are an inexpensive way to quickly gather vast volumes of data from a diverse population. They enable comparisons between groups and locations, are standardizable, and are practical. But keep in mind that a survey only records the data that respondents are willing to submit and that the method itself (as the structured connection between the researcher and the researched) permits. The fact that a social relationship is involved in the research process itself leads to the problem of social desirability [24].

Correlational analysis plays a major role in the development of surveys, assuming that answers to questions correlate to reflect the same concept. Though it is frequently the case, this is not always true. Driven by a common third element, correlations can also be misleading. When measuring vague symptoms with connected origins and effects, as this one is, this becomes more troublesome. Mathematically complex solutions are not possible for this fundamental problem [25].

Compared to single radio answers, checklists (i.e., multiple response alternatives), and simple likert scales, constant sum scales are less commonly employed in surveys. For customers or respondents, they are a great way to introduce variance into a data collection and determine which elements are important and which are not. It comes in particularly handy when you have to ask a client or respondent a question in which you think multiple elements are very important or crucial. Compared to other question kinds, a constant sum increases the likelihood of producing differentiation in the data [26]. By employing this method, we ensure that we capture a comprehensive and accurate representation of public opinion which, in turn, will enable all relevant stakeholders, especially the government, to better understand address the challenges and vulnerabilities faced by the country in the face of future health crises.

3 Material and Methods

3.1 Research Design

This study used a quantitative survey method with a cross-sectional design. The study population consisted of Indonesian people spread across 19 provinces, with a total of 224 participants. Participants were selected randomly and asked to complete a survey coupled with a numerical scale on national health resilience and their perceptions of the pandemic. The variables observed in this study include nine variables are outlined in the following subheading.

3.2 Data Analysis

We distributed a survey construct containing several questions (variables, Var) as follows:
Var 1: I am actively looking for my own information about the pandemic in general.
Var 2: I rely on information provided by the Indonesia Government (via any media).
Var 3: I just surrender (what will happen will happen) to face the pandemic.
Var 4: I believe being exposed to COVID-19 is fate (cannot be avoided, cannot be prevented).
Var 5: I believe I already have a good immune system (without any vaccination or immunization, including the anti-COVID-19 vaccine).
Var 6: I believe that the vaccinations or immunizations that I have had have protected me from dangerous diseases.
Var 7: When I was still in the COVID-19 pandemic, I made excessive purchases (panic buying) for protective items such as masks, hand sanitizer, 70% alcohol spray, etc.

Var 8: From the start I was confident that Indonesia could get out/get through this COVID-19 pandemic well.
Var 9: After seeing the developments and efforts made by the government, I am confident that Indonesia can get out/get through this COVID-19 PANDEMIC well.
Each participant was facilitated to score 0-100 according to their best fit perspective or judgement. The survey was built using google form. We distributed the participation invitations randomly to a number of communities in several cities from different provinces. The inclusive criterion was that the participants must be 18 years of age or older. No gender or other social and cultural restrictions applied throughout this study.

3.3 Formatting the text

We employed one way ANOVA on GraphPad Prism 8.0.2 with a Games-Howell's multiple comaprison to evaluate and observe if there was a remarkable significant difference among variables being observed. The significance was determined at $\alpha<0.05$.

4 Results and Discussion

We aimed at measuring the inner perspective of Indonesian citizen toward their government in handling health-associated threat with a considerably new concept of a survey coupled with a numerical scale. The survey was designed to provide the participants not only with the angle of the first person being directly observed but also a standpoint where the participants view the government's motion in regard to pandemic management. This approach is different from several published reports. Henao-Kaffure et al (2021), for instance, examined the concepts of bridging public health with science education through the historical-territorial critical lens. The study highlighted the fragility that many people experience [27]. In the same year, Schiff et al investigated how the binational university students (Ukraine and Israel) had gone through the pandemics. They showed that there was a strong correlation between the level of exposure and the challenges, despite the fact that these may vary depending on the nation and setting. Furthermore, anxiety levels can rise if a community threat is covered by the media on a regular basis [28].
Our present approach was to look at how Indonesians view themselves as both the impacted body and the active player in the pandemic era and how they consider the intervention strategy being implemented by the government, in an ideal consideration. This is to comprehend how they value their own significance, at an individual level, that is undeniable essential in building health resilience, in a national level.
Taking into account that using Likert's scale we might not get a highly diverse dataset; we used sum constant instead. Although Likert's scale is more commonly used but it potentiates an off-target response meaning the participants would find it hard to position the extent of their agreement or disagreement. For instance, when participants found themselves in between Agree and Strongly Agree or in between Disagree and Strongly Disagree, they might find it difficult to project their response into one fittest point. This causes the accumulative data to lose their representativeness. Therefore, we applied a sum constant scale where participants were allowed and facilitated to mark the extent of their standpoint for each given statement.
In this study, initially we extracted 255 datapoints from eligible participants. However, post-screening and quality control the remaining data were 224. We removed the datapoints that were not numerical. Despite clear instructions being provided in the opening part of the survey, some respondents failed to comply. For instance, instead of scoring 0-100 for each statement (items in the survey), some respondents worded out their perspective such as "I

don't think so because……", "it takes time….". Rather than risking the data loaded with misinterpretation, we put number instead.
Our ANOVA test results in comparison as shown in Table 1:

Table 1. Games-Howell's multiple comparisons for 10 variables being observed.

Games-Howell's multiple comparisons test	Mean 1	Mean 2	Mean Diff.	95.00% CI of diff.	Significant?	Summary	Adjusted P Value
1 vs. 2	68.46	55.85	12.62	4.839 to 20.39	Yes	****	<0.0001
1 vs. 3	68.46	34.68	33.79	25.35 to 42.23	Yes	****	<0.0001
1 vs. 4	68.46	38.62	29.84	20.92 to 38.76	Yes	****	<0.0001
1 vs. 5	68.46	38.55	29.91	20.93 to 38.90	Yes	****	<0.0001
1 vs. 6	68.46	75.44	-6.977	-13.93 to -0.01976	Yes	*	0.0487
1 vs. 7	68.46	35.27	33.19	24.83 to 41.55	Yes	****	<0.0001
1 vs. 8	68.46	73.89	-5.427	-12.59 to 1.740	No	ns	0.3088
1 vs. 9	68.46	77.72	-9.257	-15.99 to -2.521	Yes	***	0.0008
2 vs. 3	55.85	34.68	21.17	12.31 to 30.03	Yes	****	<0.0001
2 vs. 4	55.85	38.62	17.22	7.902 to 26.54	Yes	****	<0.0001
2 vs. 5	55.85	38.55	17.3	7.918 to 26.68	Yes	****	<0.0001
2 vs. 6	55.85	75.44	-19.59	-27.06 to -12.13	Yes	****	<0.0001
2 vs. 7	55.85	35.27	20.57	11.79 to 29.35	Yes	****	<0.0001
2 vs. 8	55.85	73.89	-18.04	-25.70 to -10.38	Yes	****	<0.0001
2 vs. 9	55.85	77.72	-21.87	-29.13 to -14.62	Yes	****	<0.0001
3 vs. 4	34.68	38.62	-3.948	-13.82 to 5.927	No	ns	0.9456
3 vs. 5	34.68	38.55	-3.875	-13.80 to 6.055	No	ns	0.9527
3 vs. 6	34.68	75.44	-40.77	-48.92 to -32.61	Yes	****	<0.0001
3 vs. 7	34.68	35.27	-0.5987	-9.967 to 8.769	No	ns	>0.9999
3 vs. 8	34.68	73.89	-39.22	-47.54 to -30.89	Yes	****	<0.0001
3 vs. 9	34.68	77.72	-43.05	-51.01 to -35.08	Yes	****	<0.0001
4 vs. 5	38.62	38.55	0.07339	-10.27 to 10.42	No	ns	>0.9999
4 vs. 6	38.62	75.44	-36.82	-45.47 to -28.16	Yes	****	<0.0001
4 vs. 7	38.62	35.27	3.35	-6.456 to 13.16	No	ns	0.9788
4 vs. 8	38.62	73.89	-35.27	-44.09 to -26.45	Yes	****	<0.0001
4 vs. 9	38.62	77.72	-39.1	-47.58 to -30.62	Yes	****	<0.0001
5 vs. 6	38.55	75.44	-36.89	-45.61 to -28.17	Yes	****	<0.0001
5 vs. 7	38.55	35.27	3.276	-6.585 to 13.14	No	ns	0.9822
5 vs. 8	38.55	73.89	-35.34	-44.22 to -26.46	Yes	****	<0.0001
5 vs. 9	38.55	77.72	-39.17	-47.71 to -30.63	Yes	****	<0.0001
6 vs. 7	75.44	35.27	40.17	32.10 to 48.23	Yes	****	<0.0001
6 vs. 8	75.44	73.89	1.55	-5.273 to 8.373	No	ns	0.9987
6 vs. 9	75.44	77.72	-2.28	-8.649 to 4.088	No	ns	0.9717
7 vs. 8	35.27	73.89	-38.62	-46.86 to -30.37	Yes	****	<0.0001
7 vs. 9	35.27	77.72	-42.45	-50.32 to -34.57	Yes	****	<0.0001
8 vs. 9	73.89	77.72	-3.83	-10.43 to 2.768	No	ns	0.6758

Table 1 clearly shows that statistical significances emerge from most comparisons using the Games-Howell's multiple comparison test, which is the enhanced version of the Tukey-Kramer approach. The Games-Howell method, which can be used when the equivalency of variance assumption is violated. It is principally a t-test with Welch's degree of freedom. This technique, which is known to maintain the predetermined significance level even when the sample size varies, employs an approach for controlling the type I error during the duration of the comparison. As a result, this approach can be used when there are six or more samples [29]. Type I error or a false positive error is an error where a valid null hypothesis is rejected. To minimize type I error, a substantial amount of literature has been written, most of it on the subjects of multiple comparisons, subgroup analysis, pre-specification of hypotheses, and related subjects [30].

If we look at one comparison by Var 1 (I am actively looking for my own information about the pandemic in general) and Var 2 (I rely on information provided by the Indonesia Government (via any media) which produce $\alpha<0.0001$, it exhibits a contradictive gesture thus a significant difference made a total sense.

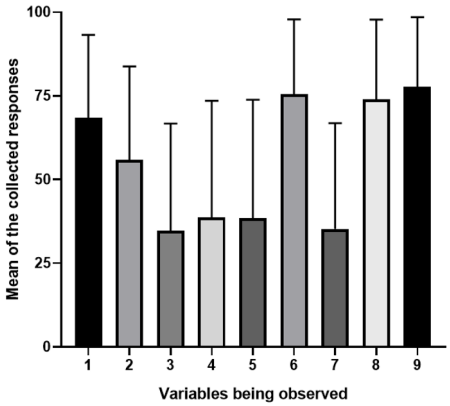

Fig. 1. The mean values of respondents' perspective on the pandemic and the government.

Whereas if we look at the comparison between Var 6 *(I believe that the vaccinations or immunizations that I have had have protected me from dangerous diseases)* and Var 8 *(From the start I was confident that Indonesia could get out/get through this COVID-19 pandemic well)*, which produce $\alpha=0.9987$ thus insignificant, it is easily grasped that both are inline statements or implying gestures in the same direction (positive as per the emotional load).
Next, we question if our construct could net proper responses. According to the mean values (Fig. 1), Var 3, 4, 5 and 7 are alike. These Vars represent pessimism, ignorance, and lack of free will-driven motion to serve a proper defence on their own health status. Conversely, Var 1, 2, 6, 8, and 9 reflect respondents' optimism, trust, and free will-driven behaviors to protect themselves without taking needless risks that could have considerably more negative outcomes.
This feature is validated by the Heatmap outlook as shown in Fig. 2.

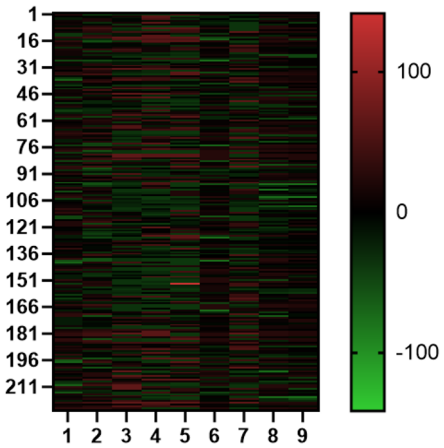

Fig. 2. Heatmap plot of ANOVA Test on the 9 variables being assessed.

Vars 1, 2, 6, 8, and 9 are moving in a different direction to Vars 3, 4, 5, and 7, as the heatmap figure demonstrates. This clarifies that as they are inherently contradictory, any comparison between any member of Vars 1, 2, 6, 8, and 9 (positive cluster) and any member of Vars 3, 4, 5, and 7 (negative cluster) will result in significance.

It is important to note that the means for the negative cluster are far lower than those for the positive cluster, suggesting that the respondents prefer to take actions to overcome the pandemic threat. Furthermore, they demonstrate faith in the government's ability to safeguard its citizens.

This observation highlights the resilience and optimism of the public during challenging times. The significant difference in the levels of the negative and positive clusters indicates that people are more inclined to engage in proactive measures to combat the pandemic, rather than succumbing to fear and despair. Additionally, their trust in the government's capacity to protect them fosters a sense of collective responsibility and hope, which can contribute to a stronger and more united response against the ongoing health crisis.

Although we drew an excellent gesture from respondents, we acknowledge that our results might not be eligible for a conclusion about Indonesia. Our respondents are, indeed, from 32 provinces in Indonesia. Yet, with a total of 224 responses that were proceeded into data analysis, they were not sufficient to conclude about the holistic Indonesia. Here, the diversity of their backgrounds acts as a normalizing mechanism to lessen prejudices and boost confidence. This could serve as a basis for presenting the viewpoint of Indonesian citizens regarding the way their government handled the pandemic problem. The government in particular can use an innate strategy to strengthen and enhance this by sustainably health-related measures that reach out to as many Indonesian citizens as possible, since our results to some extent reflect the trusts. To validate our current findings and develop a solid mathematical model that can be used to handle all predictive features, more research with a larger sample size and many more stakeholder participations is needed.

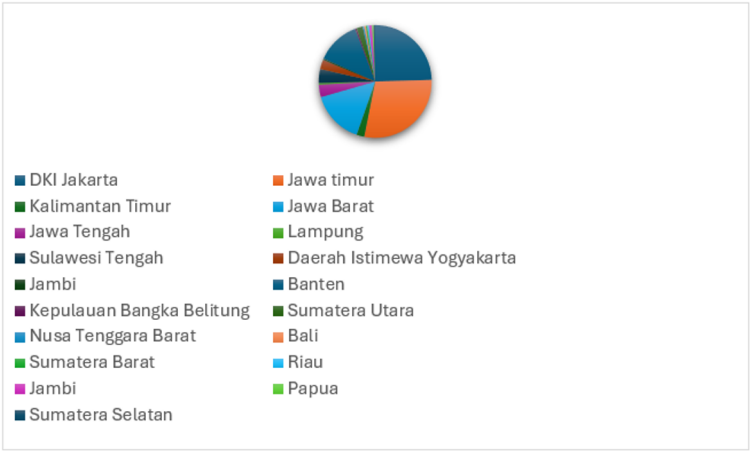

Fig. 3. The distribution of respondents.

Our respondents reside in 19 provinces out of 38 total provinces in Indonesia. They were asked to consider their current whereabouts as their origins instead of their places of birth or their permanent residences. We assumed that their perspective toward things or phenomena is affected by their proximity to the source of information thus places of birth are deemed to be irrelevant.

5 Conclusion

From the results and discussions that have been presented, we can conclude that this study provides a deep understanding of the perspective of the Indonesian people on the government's response to health threats, especially in the context of the COVID-19 pandemic. Compared to the Likert scale which has the potential for central tendency bias, the use of surveys with a constant number scale proves to be an effective method of obtaining more varied and detailed data, although some challenges related to the implementation of instructions still exist. Statistical analyses conducted, particularly the Games-Howell double comparison test, revealed significant differences in people's perspectives on various aspects of the government's response. These findings indicate strong optimism and confidence from the public in the government's ability to deal with the health crisis, as well as their commitment to proactive measures to fight the pandemic. However, it is worth noting that these results might reflect only partially due to some unparticipating provinces. Nonetheless, these findings provide valuable insights into Indonesian attitudes and perceptions, which can be used as a basis for the development of more effective government policies and response strategies.

Further research with larger and more even sample sizes is needed to develop future models. These measures will assist governments in strengthening their response to public health and increase the effectiveness of measures taken in addressing the ongoing health crisis.

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