Asian Development Policy Review
ISSN(e): 2313-8343
ISSN(p): 2518-2544
DOI: 10.55493/5008.v11i2.4751
Vol. 11, No. 2, 67-78.

URL: www.aessweb.com

Factors influencing the willingness to pay for masks during the COVID-19 pandemic: Empirical evidence from Indonesia

Restiatun Restiatun[1+]
Akhmad Yani[2]
Nurul Bariyah[3]
Romi Suradi[4]

[1,2,3,4]*Universitas Tanjungpura, West Kalimantan, Indonesia.*
[1]*Email: restiatun@untan.ac.id*
[2]*Email: akhmad.yani@ekonomi.untan.ac.id*
[3]*Email: nurul.bariyah@ekonomi.untan.ac.id*
[4]*Email: romi.suradi@ekonomi.untan.ac.id*

(+ Corresponding author)

Article History
Received: 28 December 2022
Revised: 10 February 2023
Accepted: 23 February 2023
Published: 16 March 2023

Keywords
Cloth mask
Comorbidities
Disposable mask
Willingness to pay
Outside activities.

ABSTRACT

The purpose of this study was to investigate the factors affecting the willingness-to-pay (WTP) value of cloth and disposable masks during the pandemic. Each type of mask has its advantages, and each individual has different considerations when choosing the mask they will buy and use. Primary data were obtained from survey questionnaires, with the qualified participants being income earners. Using a snowball sampling technique, a total of 1144 people were selected as participants from 14 Indonesian provinces. Data collection was carried out and questionnaires were distributed through Google Forms and a WhatsApp group, respectively, for 7 days. The results showed that the WTP value of cloth and disposable masks was significantly influenced by similar variables, including age, education, income level, number of household members, activities outside the home, and the presence of comorbidities. All the variables had similar effects on the WTP value of cloth and disposable masks. The absence of differences in the WTP value implies that the most important consideration in reducing the risk of exposure to Covid-19 was not the type of mask but the discipline of wearing a mask when performing activities outside the home.

Contribution/ Originality: The innovation of this research lies in the novelty of the Covid-19 pandemic case, which entailed differences in individuals' or households' perceived risk of the disease, which, in turn, had an impact on compliance and the willingness-to-pay value of masks.

1. INTRODUCTION

The COVID-19 outbreak exerted pressure on the health sector, presenting a new challenge for almost all countries in the world, including Indonesia (Djalante et al., 2020). Due to its high population density, this country was predicted to be significantly affected for a long period (Asia Development Bank, 2020). According to the World Health Organization, COVID-19 is transmitted through coughing, sneezing, or speech droplets (Liputan6.com, 2020). This led to the required use of masks as one of the effective methods to reduce the spread of the virus and provide marginal protection (Chicago Sun-Time, 2020). When individuals are diagnosed with various comorbidities, their exposure conditions are reportedly worsened (Sanyaolu et al., 2020). Some relevant common comorbidities include diabetes mellitus (DM), systemic lupus erythematosus (SLE), kidney diseases, coronary diseases, hypertension, tuberculosis, chronic obstructive pulmonary disease (COPD), cancer, and geriatric-related disorders (Kompas.com, 2020).

Besides requiring the use of masks, the government's and social institutions' attention during this pandemic also reportedly focused on the delivery of information through mass media. This specifically aimed to increase the public's awareness and promote lifestyle transformations that would reduce the spread of the virus. Based on the community as information recipients, the massive amount of data about COVID-19 led to various responses, such as the emergence of excessive public worry about the dangers of the virus. In this case, mask usage when leaving the house, washing hands, and practicing clean living were recommended as procedures to prevent the transmission and spread of the disease. However, excess worry made some people respond to these procedures in dramatic and unusual ways. The pandemic affected the daily lives of many people (Grashuis, Skevas, & Segovia, 2020) including socioeconomic and psychological aspects (Yoshizaki, de Brito Junior, Hino, Aguiar, & Pinheiro, 2020). Some people also assumed it to be a dramatic event requiring dramatic responses, particularly regarding the need to spend money on adequate protection. This led to "panic buying" of masks and other medical equipment, such as expensive hand sanitizers (Ma'Arif, 2020). Excess worry about personal safety increased the community's willingness to pay (WTP) for protective commodities against the disease.

Panic buying in the community is motivated by anxiety and a desire to stop worrying; it helps people feel in control of the situation on a psychological level. Given these conditions, individuals or households often feel the need to take action in response to a critical circumstance. However, they also possess rational behaviors during panic buying (Mankiw et al., 2013). Based on the existing supply, rational people are known to buy excessive amounts of a commodity, initially to secure and satisfy themselves. The COVID-19 pandemic stimulated "herd behavior," in which intuition heuristics promote the purchase of unwanted and unnecessary products by specific people. However, economic behavior emphasizes the systematic occurrence of irrational attitudes (Conlisk, 1996). This promotes panic buying in the community; in this case, the excessive and unnecessary purchase of masks and other medical equipment led to scarcity. In the long term, panic buying is found to negatively affect consumption and economic growth as it leads households to allocate financial resources to purchase unnecessary and excess goods, specifically at very high prices. This is reflected in an increase in their WTP values. Therefore, panic buying in the community leads to greater inflation, which then causes a decline in people's purchasing power for non-health commodities. This indicates that panic buying behavior negatively affects all aspects of people's lives. Therefore, this study aimed to examine the high WTP value for mask utilization and determine the factors that influenced it during the COVID-19 pandemic in Indonesia.

2. LITERATURE REVIEW

Many individuals or households displayed a tendency to purchase large amounts of health protection equipment, specifically masks, as a measure to prevent the spread of COVID-19 amongst themselves and their families, regardless of the price. This was due to the high level of worry in the community about the dangers of exposure to the disease. When the buying and hoarding of masks is increasingly believed to be profitable, the community's WTP also increases. According to welfare economic theory, the benefit of a service or intervention is defined as each individual's maximum WTP value. Bateman, Langford, Munro, Starmer, and Sugden (2000) stated that four tools can be used to calculate the WTP, based on the assumption that individuals often consumed two types of goods, X and Y. In this case, X = a specific commodity, and Y = a composite, measured in value for money (in Indonesian rupiah (IDR)). For consumption changes, WTP is also measured as the change in the value of the individual item from x to x' (where x' > x) or vice versa, regarding some initial endowments where y = numeraire.

In Indonesia, the types of masks widely used in the community are paper and cloth. For reasons of hygiene, paper masks are only used once to protect the wearer and others with whom they are in close contact. Meanwhile, cloth masks are used to block the spread of droplets through talking, coughing, or sneezing. These are often used to reduce the spread of the virus in asymptomatic people, who are at risk of inadvertent exposure. They are also more economical as they can be easily washed and reused (Aida, 2020). The community panic about the dangers of COVID-

19 did not promote coordinated behavior among members of society regarding the implementation of joint action. Some individuals or households only thought about the safety of themselves and their families. In this case, panic buying was a social phenomenon that affected several countries, and many goods experienced stock shortages and periodic price spikes, particularly personal protective equipment. These phenomena were observed in Indonesia (Wardhani, 2020), as well as in Europe and the Americas (New York Daily News, 2020). The widespread information about the dangers of COVID-19 in the mass media led to community panic. This was in line with the Cultivation Theory of Gerbner and Gross (1976).

Panic buying in the community is often motivated by various psychological factors that occur due to the acquisition of incomplete information. These subsequently trigger worry and excessive buying. In this case, the elevation of worry led to the following assumptions developing: (1) The prices of masks are likely to increase if individuals do not buy them immediately, and (2) Masks are likely to become unavailable if individuals do not buy them immediately. When most people possess similar thoughts, it results in systemic irrationality. In this case, panic behavior is caused by the existence of communal awareness, which emphasizes a group of people's attitudes. This is known as the informational cascade, a phenomenon reflecting the similarity of individual choices when confronted with similar situations. These choice similarities are not carried out simultaneously but cause a domino effect. Therefore, the panic responses of a few individuals or small groups become a mass situation (Brown, 1954).

Panic buying is the psychological response of people toward specific products, even when they are not a top priority. Although the products purchased are not normal or daily top priority requirements (such as masks), they are still highly sought after during various crises, such as a pandemic. This is because humans often experience an intellectual decline in processing information, analyzing the environment, and developing alternative decisions during critical situations (Strahle & Bonfield, 1989). These inadequacies subsequently trigger sellers to engage in price gouging by exponentially increasing commodity prices in a relatively short period (CNN Indonesia, 2020). Furthermore, panic buying can be explained through a game theory framework (Jovanka & Juan, 2020) where two possibilities are encountered, namely (1) People purchasing excess goods (panic buying), and (2) People not hoarding or overspending on goods (Normal Behavior). For example, when all members of a community behave normally, no individual or household hoards health protection equipment, such as masks. Thus, when the entire community behaves normally, the availability of goods is guaranteed through adequate distribution. However, the choices of other community members are undetermined when an individual or household behaves normally. This is due to the inability of the community to coordinate en masse. This coordination uncertainty causes logical appropriateness in panic buying performances, with normal-behaving individuals or households having nothing left to purchase. Table 1 presents panic buying behavior according to the game theory approach.

Table 1. Game theory framework for panic buying during the pandemic.

Decision		**Community**	
		Panic buying	**Not panic buying**
Individual	Panic buying	Individuals are likely to obtain or hoard goods, leading to shortages	Individuals obtain goods, leading to no shortage
	Not panic buying	Individuals do not obtain goods so they experience shortages	Individuals and the community obtain goods, indicating no shortage

Based on this framework, every individual or household in the community encounters the game matrix. It shows that the best attitude is when both individuals and the community decide against panic buying. However, imperfect information causes rational individuals to select panic buying behaviors, leading to the excess acquisition of goods. When more individuals in the community have a higher WTP for personal protective equipment, such as masks, some households will likely fail to obtain the required goods due to shortages. Therefore, the uncertainty of household choices is determined by the most rational decision at the individual level. This decision is observed to be the dominant

strategy, where an individual's decision leads to better outcomes than the alternative for another individual. Mass panic buying shows that every individual or household is confronted by similar possible outcomes. In this case, everyone decided to overbuy the desired goods. Inflation and shortages of specific goods indicated that all members of the community implemented a dominant strategy (Nash equilibrium), leading to a collective loss.

3. METHODOLOGY

The utilized primary data were obtained through a survey questionnaire, with a snowball sampling technique used to identify, select, and acquire samples through a network or continuous relationship chains (non-probability sampling) (Sugiyono, 2016). The questionnaire was distributed through a WhatsApp group, with all members instructed to participate in distributing the instrument on other media platforms for a specified time limit. Based on reports stating that financial variables (income) influenced the WTP value (Machnes, 2006; Massardi, Adji, & Pradiptyo, 2017; Saver & Doescher, 2000), only income-earning individuals were qualified to participate. The distribution of the questionnaires was carried out for one week from April 17 to 24, 2020. Paper and cloth masks were used by every Indonesian citizen who participated, and their geographical origin ranged from Sabang (Western Indonesia) to Merauke (Eastern Indonesia).

To obtain the WTP value, an open-ended question and a bidding game were used. In the open-ended question, the participants were only asked about the WTP value. Meanwhile, in the bidding game, the interviewer asked yes/no questions to determine whether the participants were willing to pay a specific IDR. In this case, the suggested WTP value was continuously increased until the participant refused. Therefore, the result obtained was not the maximum value willing to be paid but an interval of the actual WTP estimation. The analysis included multiple linear regression of the obtained data. Table 2 presents the operational definitions of the research variables.

Table 2. Operational definitions of the variables.

Variables	Operational definition	Value
Willingness to pay (WTP)	The maximum amount of money (IDR) willing to be paid by an individual to buy masks	IDR
Comorbidities or congenital diseases (Com)	A dummy describing the presence or absence of diseases besides the main disorder. Comorbidities included high blood pressure, diabetes mellitus, and tuberculosis.	1 when having comorbidities and 0 otherwise
Age (Age)	Age of subjects at the time of filling out the questionnaire	Years
Education (Edu)	A dummy describing the Education Level	1, 2, 3, and 4 = < Ungraduated, Undergraduate, Graduate, and Postgraduate
Family income (Inc)	Total income obtained by a family/month. This includes the wages and/or salaries obtained by both husband and/or wife	1 = 2 million ≤ inc < 4 million IDR, 2 = 4 million ≤ inc < 7 million IDR, and 3 = inc > 7 million IDR
Number of family members (Fam)	The number of people living in one household	People
Activities outside the home (Act)	A dummy describing the presence or absence of activities outside the home, such as working, shopping, performing worship, etc.	1 when performing activities outside the home and 0 otherwise

Based on the study hypothesis, the probit regression model and ordinary least squares (OLS) technique were used to estimate the relationship between the variables. Based on several previous studies (Machnes, 2006; Massardi et al., 2017; Saver & Doescher, 2000), the model describing WTP = $\alpha 0 + \beta i x_h + zi$ was adopted, where x_h = an individual characteristic including income level, α and β = model parameters, and zi = a random term with a normal standard distribution. In this case, the utilized estimation model can be mathematically expressed as follows:

$$WTP_i = \beta_0 + \beta_1 Age_i + \beta_2 Edu_i + \beta_3 Fam_i + \beta_4 Act_i + \beta_5 Inc_i + \beta_6 Com_i + \varepsilon_i \quad (1)$$

Equation 1 thus presents the estimation of the WTP value of cloth and disposable masks.

4. RESULTS AND DISCUSSION

4.1. Demographic Characteristics of Respondents

The utilized primary data were obtained from questionnaires digitally distributed to 1,144 participants from 15 Indonesian provinces through social media. Concerning their gender, 610 (53.3%) and 534 (46.7%) participants were male and female, respectively. Meanwhile, 575 (50.3%), 500 (43.7%), and 69 (6%) were 25-40, 41-50, and > 56 years old, respectively. The participants, therefore, were almost all of productive age and were very likely to continue to perform activities outside the home during this pandemic, for work or other purposes. This condition subsequently affected their WTP value for masks.

Education influences the knowledge level of an individual, including (1) The understanding of the dangers of COVID-19, (2) The virus distribution patterns, and (3) The agents responsible for the reduction of possible exposure. Of the participants, 827 (72.3%), 4 (0.3%), and 313 (27.4%) had a Post Graduate, Graduate, undergraduate, and ungraduated, respectively. This indicates that most participants were likely to have a high degree of awareness of the importance of wearing a mask when performing activities outside the home. These conditions subsequently influenced their WTP value for masks.

Income is reportedly an important determinant of an individual's WTP value of a good or service (Machnes, 2006; Massardi et al., 2017; Saver & Doescher, 2000). Based on this determinant, 494 (43.2%), 369 (32.3%), and 281 (24.6%) participants earned IDR 2,000,000–IDR 4,000,000, IDR 4,000,000–IDR 7,000,000, and > IDR 7,000,000, respectively. Meanwhile, of the respondents, 587 and 557 were family heads and family members, respectively. This proves that household decisions in Indonesia are performed by or at least with the consent of the family head. The number of household members also affects the expenditure on goods to be purchased, in terms of the available income and price. Higher numbers of family members led to the purchase of more masks. In this case, a total of 416 (36.4%), 713 (62.3%), and 15 (1.3%) participants had 3, 4-7, and > 8 family members, respectively.

Regarding the high level of anxiety about COVID-19, some Indonesians kept continuously up to date about certain types of information, such as the number of victims, exposure opportunities, and useful ways to reduce risk. Of the participants, 1048 (91.6%) kept continuously up to date, and 96 (8.4%) did not. This indicates that most individuals were very likely to obtain continuous updates related to the pandemic's exposure risk (Massardi et al., 2017). A total of 1097 (95.9%) and 26 (2.3%) participants stated that the COVID-19 disease was dangerous and harmless, respectively, while the remaining participants did not have an opinion on the nature of this disease.

Based on the collected data, some individuals experienced behavioral transformation, which included (1) Staying at home, (2) Consistent mask-wearing when performing activities outside the home, and (3) Frequent washing of hands. These changes were found to affect their subjective beliefs about the likelihood of contracting the virus. However, most of these individuals did not care or attempt to obtain any information about the COVID-19 pandemic. According to the survey, 535 (46.8%), 429 (37.5%), and 159 (13.9%) participants judged the probability of being exposed to the virus as low, high, and indifferent, respectively. The data are presented in Table 3.

Comorbidities contribute to the risk of death in individuals exposed to COVID-19 (Hafidh, 2022). Based on the survey data, 272 (23.8%) participants had various comorbidities, such as heart disease, high blood pressure, tuberculosis, and diabetes mellitus. Meanwhile, the remaining 872 (76.2%) were unaffected. Regarding the increase in mortality rates, the Indonesian government appealed to all community members to stay at home during the pandemic, with most private and public agencies enabling their employees to work from home (WFH). Irrespective of these policies, some individuals still left their homes to work. This was supported by the obtained survey data, where 820 (71.7%) and 324 (28.3%) participants WFH and left home to work, respectively. Aside from the individual concerned, family members frequently leaving home to work also increased the probability of COVID-19 exposure.

This was in line with the obtained data, where a total of 731 (63.9%) participants had family members working outside the home during the pandemic, and 413 (36.1%) did not.

Table 3. Participants' responses based on their mastery of COVID-19 information.

Indicator	Responses				Percentage (%)			
COVID-19 information update	Yes		No		Yes		No	
	1048		96		91.6		8.4	
Perception of COVID-19 disease	Dangerous	Not dangerous	Unknown		Dangerous	Not dangerous	Unknown	
	1097	26	21		95.9	2.3	1.8	
Perception of exposure risk	Low	High	Unlikely	Unknown	Low	High	Unlikely	Unknown
	535	429	21	159	46.8	37.5	1.8	13.9

Source: Primary data, processed.

The government's stay-at-home appeal emphasized the reduction of the risk of exposure to the virus. A total of 1091 (95.4%) and 53 (4.6%) participants complied and did not comply with the government's appeal to carry out physical social distancing, respectively.

This indicates that most of the participants always wore masks when forced to leave their homes, with only 53 of them not complying with the policy. The government's strong efforts to reduce COVID-19 cases were also carried out through law enforcement, where non-compliant citizens underwent a legal process according to Articles 212, 216, and 218 of the Criminal Code (hukumonline, 2020). Based on the survey data, 44 (3.9%), 1,078 (94.5%), and 22 (1.6%) participants used masks due to government regulations, to reduce the risk of exposure, and other reasons, such as aesthetics and fashion, respectively (Andryanto, 2021).

During the COVID-19 pandemic, disposable paper and cloth masks were introduced, with both products having their advantages and disadvantages.

Of the participants, a total of 259 (13.6%) elected to use disposable masks when performing activities outside the home, and 885 (77.4%) used cloth masks. Several reasons were observed for this choice, including (1) the protective ability against COVID-19 exposure, (2) the price, and (3) the purchase accessibility. In addition, a total of 439 (38.4%), 50 (4.4%), and 655 (57.3%) participants selected masks for their protective abilities, price, and purchase accessibility, respectively.

Various organizations contributed to reducing exposure to the virus, such as by distributing free masks. In this way, a total of 117 (10.2%), 964 (84.3%), and 63 (5.5%) participants used free, purchased, and personally-constructed masks, respectively.

4.2. Willingness to Pay Value Regression Results

4.2.1. Willingness to Pay Value of Masks Based on Demographic Characteristics

Age often affects individuals' activity patterns, with those in the productive age generally displaying high mobility and social activity (Elviani et al., 2021).

This is supported by several previous studies (Elviani et al., 2021; Putri, Putra, & Mariko, 2021) in which the age group < 50 years was more at risk of COVID-19 infection than those ≥ 50. However, the Ministry of Health of Indonesia (2020) argued that the elderly often have various vulnerabilities due to the gradual decrease of their physiological functions, including the body's immune system. Based on age, each individual's perception of exposure risk varied, which was likely to affect the WTP value of masks. The results indicated that participants between 26-40 and 20-25 years old had the highest average WTP values for disposable and cloth masks, respectively. Table 4 presents the WTP value for masks, both disposable and cloth, based on respondents' age.

Table 4. Willingness to pay value of masks based on respondents' age.

Age (Years)	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
20 – 25	10376.16	14953.14
26 – 40	21533.64	11331.01
41 – 55	11547.39	11101.73
> 56	13728.66	9976.56

Individuals' educational levels also determine their level of understanding and concern (self-awareness) regarding the dangers and prevention of COVID-19. People's behaviors are determined by various factors, including mask-wearing discipline, perceptions of COVID-19 exposure risk and prevention efforts, and the encountered challenges (Djupri & Sulistia, 2021; Gannika & Sembiring, 2020; Purnamasari & Raharyani, 2020). The results show that participants with Senior High School and University education levels had the highest average WTP values for disposable and cloth masks, respectively. The WTP value of masks based on respondents' education level is presented in Table 5.

Table 5. Willingness to pay value of masks based on respondents' education level.

Education level	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
Junior High School	2600.63	4333.33
Senior High School	16758.35	10292.20
Vocation – Undergraduate	10852.01	11388.56
Graduate	14528.44	12379.01
Postgraduate	7835.91	11616.96

The WTP value of a good or service is inseparable from income (Machnes, 2006). This means that the WTP value is affected by the ability to pay. Therefore, the participants with income levels of 5,000,001 < Inc < 9,000,000 and > 9,000,000 had the highest average WTP values for disposable and cloth masks, respectively. The WTP value of masks based on the respondents' income is presented in Table 6.

Table 6. Willingness to pay value of masks based on respondents' income.

Income	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
3.000.000 < Inc < 5.000.000	5250.00	30000.00
5.000.001 < Inc < 9.000.000	14762.78	11400.7
> 9.000.000	14311.41	12341.13

The occupation of individuals determines their income and activity levels, including during the pandemic. People with an occupation requiring frequent physical interactions and direct transactions (traders) had a relatively high exposure prevalence to COVID-19. Those working in public services, such as State Civil Apparatus/Police/Army also had high exposure risks. The results showed that the highest average WTP values for disposable and cloth masks were observed for public service workers and entrepreneurs, respectively. The WTP value of masks based on the respondents' income is presented in Table 7.

Table 7. Willingness to pay value of masks based on respondents' occupation.

Occupation	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
State civil apparatus/Police/Army	17898.36	12023.29
Homemaker	6465.51	9046.06
Retired	6000.61	7147.12
Entrepreneur	5250.00	13000.00

The number of family members determines the expenditure on the purchase of masks. Large households must spend a larger total amount on masks. However, regarding income level, fewer masks are commonly purchased when prices become more expensive. Therefore, the households with the smallest number of family members (0-3 people) had the highest average WTP value for disposable and cloth masks. The WTP value of masks based on the respondents' number of family members is presented in Table 8.

Table 8. Willingness to pay value of masks based on respondents' number of family members.

Number of family members (People)	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
0 – 3	10133.77	11104.59
4 – 7	5250.00	8000.00
> 8	9006.686	7070.89

The government's campaign to prevent the transmission of COVID-19 was not always considered positively by the community. However, most of the respondents performed physical distancing or always wore a mask when conducting activities outside their homes. The response pattern of each individual was specifically and strongly influenced by their subjective beliefs of the risk of virus exposure. The results showed that individuals with high and low exposure risk perceptions had the highest average WTP values for disposable and cloth masks. The WTP value of masks based on the perception of COVID-19 exposure risk is presented in Table 9.

Table 9. Willingness to pay value of masks based on perception of COVID-19 exposure risk.

Probability of COVID-19 exposure	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
High	12924.23	11856.65
Low	10808.79	10517.55
Unlikely	6305.95	7947.68
Unknown	5250.00	3000.00

Comorbidities cause worse outcomes for individuals exposed to COVID-19 (Sanyaolu et al., 2020). The presence of these conditions within people or their families often affects mask-wearing discipline when they perform external activities. The results showed that individuals with comorbidities had the highest average WTP values for cloth masks, and those without comorbidities had the highest average WTP value for disposable masks. The WTP value of masks based on respondents' and their families' comorbidities is presented in Table 10.

Table 10. Willingness to pay value of masks based on comorbidities of respondents and their families.

Comorbidities	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
YES	15250.00	13000.00
NO	16781.73	10821.86

To prevent the transmission of COVID-19 and the increase in patient numbers, individuals adhere to the government's appeal through mask-wearing discipline when performing activities outside the home. People with high protection discipline display relatively high levels of mask usage when performing external activities. In this case, the individuals with high levels of mask use need more masks during a similar period. Regarding income level, those with high mask-wearing discipline also prefer lower prices. The results showed that participants who always wear a mask when performing activities outside the home had the lowest average WTP values cloth masks, but not the lowest average WTP for disposable masks. The WTP value of masks based on the mask-wearing frequency when performing activities outside the home is presented in Table 11.

Table 11. Willingness to pay value of masks based on mask-wearing frequency when performing activities outside the home.

Mask-wearing frequency	Average willingness to pay value of disposable masks (IDR)	Average willingness to pay value of cloth masks (IDR)
Always	5250.00	10000.00
Never	6000.00	10133.33
Sometimes	2261.94	10038.48

4.2.2 Estimation Results and Interpretations

According to the estimation outputs of the WTP for disposable masks, the mathematical equation in Equation 2 and the following interpretations are observed:

$$WTP_i = \beta_0 + \beta_1 Age_i + \beta_2 Edu_i + \beta_3 Fam_i + \beta_4 Act_i + \beta_5 Inc_i + \beta_6 Com_i + \varepsilon_i \quad (2)$$

Table 12 presents the estimation results of the WTP for disposable masks.

Table 12. Estimation results of willingness to pay for disposable masks.

Variable	Coefficient	t-statistic	Prob. value
Constant	-45647.55	-11.72942*	0.0000
Age	3637.202	3.349102*	0.0008
Edu	3673.108	3.536137*	0.0004
Fam	4518.500	3.053635*	0.0023
Act	14460.15	8.750156*	0.0000
Inc	18897.32	13.29054*	0.0000
Com	23492.08	12.96176*	0.0000
R^2	0.394150		
F Statistic	123.2837		
Prob (F statistic)	0.000000		

Note: * denotes significance at $\alpha = 0.01$.

Based on these results, all independent variables had a significant positive relationship with the WTP value of disposable masks, with comorbidities showing the largest magnitude. For the Prob value (F Statistics), all regressors significantly affected the WTP value of disposable masks. Among other factors, the participants' age significantly and positively influenced these values, indicating that older participants' perceptions of the COVID-19 exposure risk were strongly affected. This can be explained by the disease vulnerabilities of the older group caused by their gradually decreasing physiological functions, including their immune system (Ministry of Health of Indonesia, 2020). Individuals' education levels also significantly and positively affected the WTP value of masks. This confirms that education influenced people's knowledge of the risk of COVID-19 exposure. In this case, greater understanding led to a greater desire to reduce the risk of infection, such as through mask-wearing discipline when performing activities outside the home. In addition, the understanding of the benefits of masks increased the WTP value.

The results also showed that the number of family members significantly influenced the WTP value of disposable masks. Members of large households were more likely to be exposed to COVID-19; therefore, the increased family exposure to COVID-19 led to higher costs incurred to restore normal health. Activities outside the home also significantly and positively affected the WTP value of disposable masks as these activities increased the risk of exposure to the disease. In this case, the higher intensity of activities outside the home led to the greater WTP value of masks. This indicates that the people who often perform these activities are willing to pay more for each mask.

As a determinant of WTP for other goods and services, participants' income also significantly and positively influenced the value of disposable masks. Higher income levels led to a greater ability to pay for each mask. Furthermore, the preference for using disposable and cloth masks was determined by their effectiveness in preventing COVID-19 exposure. Based on the estimation outputs of the WTP for cloth masks, the resulting mathematical equation is presented in Equation 3:

$$WTP_i = \beta_0 + \beta_1 Age_i + \beta_2 Edu_i + \beta_3 Fam_i + \beta_4 Act_i + \beta_5 Inc_i + \beta_6 Com_i + \varepsilon_i \quad (3)$$

Table 13 presents the estimation results of the WTP for cloth masks.

Table 13. Estimation results of willingness to pay for cloth masks.

Variable	Coefficient	T-statistic	Prob. value
Constant	-41582.04	-10.73196*	0.0000
Age	3547.886	3.281293*	0.0011
Edu	3038.474	2.938091*	0.0034
Fam	4550.010	3.088514*	0.0021
Act	15125.32	9.193097*	0.0000
Inc	19113.44	13.50193*	0.0000
Com	23925.27	13.25908*	0.0000
R^2	0.396798		
F statistic	124.6568		
Prob (F statistic)	0.000000		

Note: * denotes significance at $\alpha = 0.01$.

The results show that the WTP for disposable and cloth masks is affected similarly by the studied variables. All the independent variables had a significant positive relationship with the WTP value of cloth masks, with the largest magnitude observed for comorbidities. In the Prob value (F Statistics), all regressors significantly affected the WTP value of these masks.

5. CONCLUSION

The individual preferences for cloth and disposable masks are largely determined by the consideration of each type of mask's effectiveness as a source of personal protection from the COVID-19 virus. However, the determinant WTP value of each mask type and the magnitude of each regressor were the same. The presence of comorbidities within individuals or their family members displayed the greatest effect on the WTP value for both disposable and cloth masks.

Funding: This research is supported by Faculty of Economics and Business, Universitas Tanjungpura, Pontianak, Indonesia (Grant number: 2325/UN22.2/PL/2021).
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study.

REFERENCES

Aida, N. R. (2020). *Comparing the effectiveness of various types of masks, from medical masks, N95, to scuba.* Retrieved from https://www.kompas.com/tren/read/2020/09/18/083500265/membandingkan-efektivitas-berbagai-jenis-masker-dari-masker-medis-n95?page=all

Andryanto, S. D. (2021). *Mask accessories add to the aesthetics of the fashion style during the pandemic.* Retrieved from https://cantik.tempo.co/read/1467868/aksesori-masker-menambah-estetika-gaya-fesyen-masa-pandemi

Asia Development Bank. (2020). *ADB approves $3 million grant to support Indonesia's fight against COVID-19.* Retrieved from https://www.adb.org/news/adb-approves-3-million-grant-support-indonesias-fight-against-covid-19

Bateman, I. J., Langford, I. H., Munro, A., Starmer, C., & Sugden, R. (2000). Estimating the four hicksian measures for a public good: A contingent valuation investigation. *Land Economics, 76*(3), 355-373. https://doi.org/https://doi.org/10.2307/3147034

Brown, R. (1954). *Mass phenomena in handbook of social psychology, ed gardner lindzey.* Reading MA: Addison-Wesley.

Chicago Sun-Time. (2020). *Ignore the mixed messages and wear that mask.* Retrieved from https://www.realclearpolitics.com/2020/04/01/ignore_mixed_messages_and_wear_that_mask_506477.html

CNN Indonesia. (2020). *Crazy corona hand sanitizer prices skyrocketed in e-commerce.* Retrieved from https://www.cnnindonesia.com/teknologi/20200313141841-185-483160/heboh-corona-harga-hand-sanitizer-meroket-di-ecommerce

Conlisk, J. (1996). Why bounded rationality? *Journal of Economic Literature, 34*(2), 669-700.

Djalante, R., Lassa, J., Setiamarga, D., Sudjatma, A., Indrawan, M., Haryanto, B., . . . Warsilah, H. (2020). Review and analysis of current responses to COVID-19 in Indonesia: Period of January to March 2020. *Progress in Disaster Science*, *6*, 1-9. https://doi.org/10.1016/j.pdisas.2020.100091

Djupri, D. R., & Sulistia, I. (2021). The relationship between self awareness, education level and discipline in wearing masks in the new normal era for residents of rt 04 rw 05, Bintaro village. *Journal of the Academy of Nursing Husada Karya Jaya*, *7*(3), 11–20.

Elviani, R., Anwar, C., & Sitorus, R. (2021). Age description at occurrence COVID-19. *Jambi Medical Journal*, *9*(2), 204–209.

Gannika, L., & Sembiring, E. E. (2020). The relationship between education level and prevention behavior for coronavirus disease (COVID-19) in the people of North Sulawesi. *NERS Journal of Nursing*, *16*(2), 83-89.

Gerbner, G., & Gross, L. (1976). Living with television: The violence profile. *Journal of Communication*, *26*(2), 182–190. https://doi.org/10.1111/j.1460-2466.1976.tb01397.x

Grashuis, J., Skevas, T., & Segovia, M. S. (2020). Grocery shopping preferences during the COVID-19 pandemic. *Sustainability*, *12*(13), 1-10. https://doi.org/10.3390/su12135369

Hafidh, A. A. (2022). *The relationship between comorbid hypertension and diabetes mellitus with mortality in patients with corona virus disease-19 (COVID-19) in General Hospital at Genteng, Banyuwangi in 2020*. Bachelor Thesis.

hukumonline. (2020). *Criminal noose for 'recalcitrant' residents who are desperate to swarm*. Retrieved from http://hukumonline.com/berita/a/jerat-pidana-bagi-warga-bandel-yang-nekat-berkerumun-lt5e7891256555d

Jovanka, M., & Juan, R. (2020). *Panic buying: Moralitas dibunuh rasionalitas buas economica.Id*. Retrieved from https://www.economica.id/2020/03/21/panic-buying-moralitas-dibunuh-rasionalitas-buas/

Kompas.com. (2020). *Pay attention, this is a list of co-morbidities that can exacerbate conditions if exposed to COVID-19*. Retrieved from https://www.kompas.com/tren/read/2020/10/12/120500165/perhatikan-ini-daftar-komorbid-yang-bisa-perparah-kondisi-jika-terpapar?page=all

Liputan6.com. (2020). *Virus Corona COVID-19 menular melalui 2 Cara ini*. Retrieved from https://www.liputan6.com/bola/read/4215173/2-cara-penularan-virus-corona-covid-19-langsung-dan-tidak-langsung

Ma'Arif, F. (2020). *Fenomena panic buying warnai Indonesia hadapi Covid-19*. Retrieved from https://www.kompasiana.com/faqih07/5e5e080a097f3656bc617203/fenomena-panic-buying-warnai-indonesia-hadapi-covid-19

Machnes, Y. (2006). The demand for private health care under national health insurance. *The European Journal of Health Economics*, *7*(4), 265-269. https://doi.org/10.1007/s10198-006-0366-x

Mankiw, N., Khoon, G. S., Boon, O. H., Hwa, Y. S., Yu, C. M., Mustafa, M. M., & Ee, Y. L. L. (2013). *Principles of economics*. New York: Cengage Learning.

Massardi, R., Adji, A., & Pradiptyo, R. (2017). The effect of medical test to belief updating and willingness to pay for health insurance premium: Evidences from laboratory experiment. *The Open Public Health Journal*, *10*(1), 41–51. https://doi.org/10.2174/1874944501710010041

Ministry of Health of Indonesia. (2020). *Avoid the elderly from COVID-19 ministry of health of Indonesia*. Retrieved from https://promkes.kemkes.go.id/tetap-sehatkan-lansia-di-masa-pandemi-covid-19

New York Daily News. (2020). *As pandemic-panicked shoppers clamor for toilet paper, bidet sales are on the rise amid coronavirus crisis*. Retrieved from https://www.nydailynews.com/coronavirus/ny-coronavirus-bidet-sales-soar-toilet-paper-20200320-sjrk2x3qwbgmjohx4g4e42fcdi-story.html

Purnamasari, I., & Raharyani, A. E. (2020). Preventive health behaviors of community during COVID-19 pandemic: A descriptive study. *Indonesian Journal of Global Health Research*, *2*(4), 301–308. https://doi.org/10.37287/ijghr.v2i4.250

Putri, N. A., Putra, A. E., & Mariko, R. (2021). Relationship between age, gender and symptoms with the incidence of COVID-19 in West Sumatra. *Andalas Medical Magazine*, *44*(2), 104-111.

Sanyaolu, A., Okorie, C., Marinkovic, A., Patidar, R., Younis, K., Desai, P., & Altaf, M. (2020). Comorbidity and its Impact on Patients with COVID-19. *SN Comprehensive Clinical Medicine*, *2*(8), 1069–1076. https://doi.org/https://doi.org/10.1007/s42399-020-00363-4

Saver, B., & Doescher, M. (2000). To buy, or not to buy: Factors associated with the purchase of nongroup, private health insurance. *Medical Care*, *38*(2), 141-151. https://doi.org/10.1097/00005650-200002000-00004

Strahle, W. M., & Bonfield, E. H. (1989). Understanding consumer panic: A sociological. *Advances in Consumer Research*, *16*(1), 567–573.

Sugiyono. (2016). *Quantitative research methods qualitative and R&D. PT*. Jakarta: Alphabet.

Wardhani, V. (2020). *Symptoms of social panic buying, these are the causes and how to overcome them accessed via*. Retrieved from https://www.merdeka.com/jatim/gejala-sosial-panic-buying-apa-penyebabnya-dan-bagaimana-mengatasinya-kln.html

Yoshizaki, H. T., de Brito Junior, I., Hino, C. M., Aguiar, L. L., & Pinheiro, M. C. R. (2020). Relationship between panic buying and per capita incomeduring COVID-19. *Sustainability*, *12*(23), 1-14. https://doi.org/10.3390/su12239968