The Influence of Coastal Proximity on Mental Health in Indonesian Society

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Abstract

Introduction

Indonesia is currently experiencing a mental health emergency and it is potentially worsening as the increase of environmental crisis. Increasing air temperatures can increase the number of people experiencing mental disorders due to environmental stress. More importantly, Indonesia is an archipelagic country, with 70% of Indonesian people live along the coast, where this area is at the lowest point on sea level and the temperature is warmer.

Purpose

This research aimed to investigate the influence of coastal proximity on community's mental health.

Method

This research used a quantitative comparative method with a total of 394 subjects who lived less than 1 to 60 km from the coastline. The subjects were selected using clustered random sampling. This study used the GHQ-12 scale to measure the mental health. The analysis was done by One Way Anova test.

Results

People living less than 1 km and more than 50 km from the coastline have a high level of mental health with the lowest distress levels. People living between 20 to 50 km from the coastline showed the lowest level of mental health with the highest distress scores.

Conclusion

This research concluded that the closer individuals live to the coastline, their mental health is better or higher.

Keywords: Mental Health, Environmental Crisis, Coastal Proximity.

Introduction

Mental health is emotional well-being of the mind, good behavioural adjustment, relative freedom from anxiety and dysfunctional symptoms and the ability to form constructive relationships and cope with everyday problems and stress.[1,2] Mentally-healthy individuals can overcome pressure in life, understand their own competence

and make critical decisions about themselves for their well-being. Mental health is a human right and it is important in personal, community and socio-economic development.

Indonesia is currently experiencing a mental health emergency. According to Indonesia's Mental Health Surveys[3] more than a third of teenagers in Indonesia experience mental health problems. These include experiencing anxiety disorders and depression. Ironically, of this total number, only around 2.6% received counselling services.[4] Another research also showed that there was not an even distribution of community health centres, general hospitals having mental health services, the number of mental hospitals in Indonesia is not evenly distributed, the number of psychologists and psychiatrists is not enough in Indonesia.[5]

Mental health in Indonesia is considered worrying. One in 5 people or around 50 million people have the potential to experience mental health problems.[6] This data expects that mental disorders in young people will affect national productivity. This would be very worrying if the government was late or wrong in taking action. [4]

On the other hand, Indonesia is also struggling with the environmental crisis. As stated by the Head of the Meteorology, Climatology and Geophysics Agency (BMKG), the climate change that is hitting the world is also having an impact on temperatures in Indonesia which are predicted to increase up to 40 degrees Celsius. [7] So that hot spots in Indonesia are increasing, according to data from the Ministry of Environment and Forestry, it was recorded that in September there were 598 hot spots in Indonesia. [8]

The two crises above can produce further problems. This climate change certainly has a big impact on people's mental health, increasing air temperatures cause people to feel uncomfortable. According to previous study [9] High temperatures affect balance

neuro transmitters serotonin and dopamine in the human brain, this influences mood, cognitive function and performance in a complex manner. Extreme hot temperatures sickness can be called hyperthermia which can cause heat stress. [10]

Moreover, extreme heat can increase irritability and depressive symptoms to increased suicidality. [11] This hot temperature can also influence behaviour, memory, sleep difficulties and worsening mental health symptoms. Additionally, the heat of the environment can affect the body's ability to regulate temperature and can result in a series of illnesses and even death. [12,13]

This research will be adapted to conditions in Indonesia, where 70% of Indonesia's population lives along the coastline. [14] There are at least 195 million people living along the coastline, according to the latest data from the previous survey.[7] This means that the air temperature in coastal areas is getting hotter. So the climate change phenomenon can trigger an increase in the number of people experiencing mental disorders.

This research will focus on discussing mental health with coastal proximity. Coastal proximity is an individual's perception of the distance they live from the coastline. Where this research will look at the level of mental health based on the distance of residence to the coastline which has been divided into several groups of distance of residence in the form of kilometres.

Previous research suggests that the closer you live to the coastline, the lower the levels of common mental health disorders such as anxiety and depression. Compared with people who live more than 50 kilometres from the coastline, they tend to have higher levels of general mental disorders. [15] Different research found that Two-thirds of the beach visitors who live about 5 miles from the beach stated that their stress level is reduced because their free time intentions are near the sea. [16] This result

strengthening the significancy of therapeutic landscape which can benefit for individual mental health.

The novelty of this research is twofold. Firstly, it examines the relationship of coastal proximity on mental health in Indonesia which is a country with many large coastal lines. Secondly, this research scrutinizes further the variative effects resulted by different house distance to coastal line.

Method

Research design

The research hypothesis is that there is a significant effect of coastal proximity on individual's mental health. To test the hypothesis, this research used quantitative methods. The One Way Anova and Two-Way Anova was used to generate the statistical significance test. Quantitative method is systematic scientific research using measuring research instruments such as questionnaires, observations, exam questions and many others.[17] The data were analysed descriptively and analytically for confirming the dependent and independent variable associations.

Research subjects

The research subjects were teenagers; (12 - 18 years), early adults; aged (19 - 40 years) and middle adults; (41 - 60 years). The inclusion criteria for subjects in this research are Indonesian people who can read and write and live near the beach or on the coast with a residence distance of less than 1 km to a maximum of 60 km from the shoreline. This study consisted of 396 subjects, dominated by the age group 19 - 40 years, (361/396; 91.6%), followed by the age group 12 - 18 years, (25/396; 6.3%) and the lowest group number was 41 - 60 years (8/396; 2%). This research was dominated by the female gender with a total of 276 with a percentage (70.1%), while the male gender was only 119 with a percentage (29.7%).

This study had a total of 396 subjects distributed across 26 provinces from 6 large islands in Indonesia. This research was dominated by subjects who lived on the island of Java with a percentage of 271 subjects (68.8%), followed by subjects from the islands of Nusa Tenggara and Bali with a percentage of 38 subjects (9.6%), subjects from the island of Kalimantan with a total of 24 subjects with percentage (6.1%), subjects from the islands of Sulawesi and Sumatra had the same number of subjects, namely 23 subjects with a percentage of (5.8%), the last for the islands of Papua and Maluku were 15 subjects with a percentage (3.8%).

One of the variables in this research is Coastal Proximity, this variable has five distance intervals. At distance intervals of less than 1 km (n= 80), more than 1 to 5 km (n= 80), more than 5 to 20 km (n= 76), more than 20 to 50 km (n= 79) and more than 50 to 60 km (n= 79).

Variables and Instruments

This research had 2 variables, namely the coastal proximity variable as variable X or independent variable (Independent) and the Mental Health variable as variable Y or dependent variable (dependent). The dependent variable is mental health. To measure this variable, the General Health Questionnaire 12 (GHQ-12) scale was used to measure mental health because it was one of the instruments that was widely used internationally in various primary health care centers. This scale was compiled by David Goldberg in 1970 and has 4 main aspects, namely somatic symptoms, anxiety and insomnia, social dysfunction and depression. Initially, the items in the GHQ consisted of 60 items, then they were shortened to 30 items, 28 items and at least 12 items. In this study, researchers used the GHQ with 12 items which were translated into Indonesian language by previous study[18], the researcher has also obtained permission from the author to use this item. Researchers used items that have been translated by Primasari & Hidayat

because these items have been used by many Indonesian researchers and foreign researchers with the subject of Indonesian society. This scale has a Cronbach's Alpha value of 0.882 on a Likert scale.

The aspects used in GHQ 12 are basically the same, only compiled into just 2 aspects, such as aspects of anxiety and depression, social dysfunction. There are 6 positive items in this item at numbers 1,3,7, 8 and 12 and there are 6 negative items at numbers 2, 5, 6, 9, 10 and 11. In this study, a Likert scale consisting of 6 answer choices was used. Positive item answer choices are Very Appropriate, Appropriate, Close to Appropriate, Slightly Inappropriate, Not Appropriate and Very Inappropriate. The answer choices for negative items are the opposite of positive items. The scores for positive items and negative items are the same, namely a score of 1 to 6.

The independent variable is coastal proximity. Coastal proximity is the perception of the distance between your residence and the beach which is measured in kilo meter and estimated in the form of intervals. This scale was compiled by Benedict W. Wheeler and published in 2012. This scale takes the form of the distance between residence and the beach which is grouped into five intervals. This form of distance interval is measured based on kilometer, namely <1 km, >1-5 km, >5-20 km, >20-50km and >50km.

Data Analysis Procedures

In this research there are several stages, namely the preparation stage, implementation stage, data processing stage and finalization. In the initial stage, namely preparing the research design starting from creating the background, deepening the material related to mental health variables with coastal proximity and searching for the scale that will be used for the research. This study used the GHQ-12 (General Health Questionnaire 12) scale which has been translated into Indonesian by previous study [18] and using the coastal proximity scale used in the research [16].

The implementation stage is the distribution of the GHQ-12 (General Health Questionnaire 12) questionnaire scale and the coastal proximity scale to predetermined subjects. This scale distribution is carried out online using Google form. The scale of this research is distributed via social media such as Facebook, Instagram, WhatsApp, Telegram and Twitter. The next stage is processing, at this stage using Microsoft Excel and SPSS version 27 software. Microsoft Excel is used to tidy up the data that has been filled in by the subject The final stage is the finalization stage, at this stage we begin to draw up conclusions, suggestions and double check the completeness in preparing the research.

Results

Based on the results of categorization calculations using SPSS version 27, mental health results were obtained as seen from the distress value, namely at a distance interval of less than 1 km there were 50 subjects who had low distress, 26 subjects had moderate distress and 4 subjects had high distress. In the distance interval of more than 1 to 5 km, 45 subjects had low distress, 32 subjects had moderate distress and 3 subjects had high distress. In the distance interval of more than 5 to 20 km, 40 subjects had low distress, 35 subjects had moderate distress and 1 subject had high distress. In the distance interval of more than 20 to 50 km there were 30 subjects who had low distress, 41 subjects had moderate distress and 8 subjects had high distress. In the distance interval of more than 50 to 60 km there were 49 subjects with low distress, 28 subjects with moderate distress and 2 subjects with high distress. (Table 5. Categorization *Mental Health based on Coastal Proximity*)

The table above shows the level of mental health based on the subject's

domicile and coastal proximity. The mental health value above shows the distress value so that the higher the value, the worse or lower the mental health and the lower the value, the better or higher the level of mental health. The data shows that at a distance of less than 1 km from the coastline, the highest level of mental health is on the island of Kalimantan and the lowest level of mental health is on the island of Sumatra. At a distance of more than 1 to 5 km from the coastline, the highest level of mental health is on the island of Kalimantan and the lowest level of mental health is on the islands of Papua and Maluku. At a distance of more than 5 to 20 km from the coastline, the highest level of mental health is on the island of Kalimantan and the lowest level of mental health is on the island of Sumatra. At a distance of more than 20 to 50 km from the coastline, the highest level of mental health is on the island of Kalimantan and the lowest level of mental health is on the islands of Nusa Tenggara and Bali. At a distance of more than 50 to 60 km from the coastline, the highest level of mental health is on the island of Sulawesi and the lowest level of mental health is on the island of Sumatra. **(**Table 6. *Mental*

Health based on Domicile with Coastal Proximity)

The table above shows the level of mental health based on age and coastal proximity. The mental health value above shows the distress value so that the higher the value, the worse or lower the mental health and the lower the value, the better or higher the level of mental health. The data shows that at a distance of less than 1 km from the beach, the highest level of mental health is aged 41 to 60 years and the lowest level of mental health is aged 19 to 40 years. At a distance of more than 1 to 5 km from the beach, the highest level of mental health is at ages 41 to 60 years and the lowest level of mental health is at ages 12 to 18 years. At a distance of more than 5 to 20 km from the coastline, the highest level of mental health is at ages 41 to 60 years and the lowest level of mental health is at ages 12 to 18 years. At a distance of more than 20 to 50 km from the coastline, mental health levels are highest at ages 12 to 18 years and the lowest mental health levels are at ages 19 to 40 years. At a distance of more than 50 to 60 km from the coastline, the highest level of mental health is at ages 41 to 60 years and the lowest level of mental health is at ages 19 to 40 years. (Table 7. *Mental Health by Age by Coastal Proximity)*

Table 5. Categorization *Mental Health based on Coastal Proximity*

Descriptive Statistics

Dependent Variable: Mental Health

Living Distance	Category	Mean	Std. Deviation	N
less than 1 km	Low	24.74	8,055	50
	Currently	46.19	5,044	26
	Tall	60.75	2,754	4
	Total	33.51	13,703	80
more than 1 to 5 km	Low	27.07	7,617	45
	Currently	46.72	5,964	32
	Tall	63.00	4,000	3
	Total	36.28	12,895	80
more than 5 to 20 km	Low	30.55	4,862	40
	Currently	44.97	4,190	35
	Tall	63.00	.	1
	Total	37.62	8,984	76
more than 20 to 50 km	Low	26.63	7,256	30
	Currently	45.90	5,004	41
	Tall	63.38	2,925	8
	Total	40.35	13,271	79
more than 50 to 60 km	Low	26.35	7,140	49
	Currently	44.61	5,425	28
	Tall	64.00	1,414	2
	Total	33.77	11,908	79
Total	Low	26.95	7,320	214
	Currently	45.69	5.123	162
	Tall	62.78	2,861	18
	Total	36.29	12,497	394

Table 6. *Mental Health based on Domicile with Coastal Proximity*

Descriptive Statistics

Dependent Variable: Mental Health

Living Distance	Province of residence	Mean	Std. Deviation	N
less than 1 km	Papua and Maluku Islands	33.00	12,562	11
	Sulawesi island	31.88	14,613	8
	Sumatera island	48.80	14,856	5
	Kalimantan island	26.88	14,961	8
	Java Island	33.67	12,534	42
	Nusa Tenggara Island and Bali	31.67	16,145	6
	Total	33.51	13,703	80
more than 1 to 5 km	Papua and Maluku Islands	40.67	10,408	3
	Sulawesi island	39.86	15,005	7
	Sumatera island	38.50	10,821	6
	Kalimantan island	31.00	12,111	4
	Java Island	36.07	13,662	42
	Nusa Tenggara Island and Bali	35.06	12,302	18
	Total	36.28	12,895	80
more than 5 to 20 km	Papua and Maluku Islands	38.00	.	1
	Sulawesi island	41.60	8,735	5
	Sumatera island	42.75	5.123	4
	Kalimantan island	36.00	11,533	3
	Java Island	37.12	9,441	52
	Nusa Tenggara Island and Bali	36.73	8,026	11
	Total	37.62	8,984	76
more than 20 to 50 km	Sulawesi island	33.00	16,971	2
	Sumatera island	41.25	4,500	4
	Kalimantan island	28.50	16,263	2
	Java Island	40.81	13,615	68
	Nusa Tenggara Island and Bali	41.67	12,097	3
	Total	40.35	13,271	79
more than 50 to 60 km	Sulawesi island	32.00	.	1
	Sumatera island	40.75	6,344	4
	Kalimantan island	34.43	15,598	7
	Java Island	33.31	11,848	67
	Total	33.77	11,908	79
Total	Papua and Maluku Islands	34.87	11,783	15
	Sulawesi island	36.52	13,252	23
	Sumatera island	42.35	9,632	23
	Kalimantan island	31.04	13,678	24
	Java Island	36.41	12,565	271
	Nusa Tenggara Island and Bali	35.53	11,666	38
	Total	36.29	12,497	394

Table7. *Mental Health by Age by Coastal Proximity*

Dependent Variable: Mental Health				
Coastal Proximity	Age Range	Mean	Std. Deviation	N
less than 1 km	12 - 8 years	30.25	10,660	8
	19 - 40 years	34.11	14,006	70
	41 - 60 years	25.50	16,263	2
	Total	33.51	13,703	80
more than 1 to 5 km	12 - 18 years	41.67	7,234	3
	19 - 40 years	36.34	12,954	74
	41 - 60 years	29.33	16,563	3
	Total	36.28	12,895	80
more than 5 to 20 km	12 - 18 years	44.20	7,396	5
	19 - 40 years	37.48	8,866	69
	41 - 60 years	26.00	1,414	2
	Total	37.62	8,984	76
more than 20 to 50 km	12 - 18 years	32.00	14,731	3
	19 - 40 years	40.68	13,209	76
	Total	40.35	13,271	79
more than 50 to 60 km	12 - 18 years	32.67	13,337	6
	19 - 40 years	34.07	11,831	72
	41 - 60 years	19.00	.	1
	Total	33.77	11,908	79
Total	12 - 18 years	35.20	11,615	25
	19 - 40 years	36.59	12,514	361
	41 - 60 years	26.25	11,323	8
	Total	36.29	12,497	394

DISCUSSION

This research found that there were significant differences in the level of mental health in five groups of subjects based on the distance between the subject's residence and the coastline. Subjects who have the best level of mental health are those who live within a radius of less than 1 km and more than 50 km from the coastline. Subjects who lived in a radius of more than 1 to 5 km from the beach had a decreased level of mental health compared to subjects who lived in a radius of less than 1 KM from the beach. Furthermore, subjects who live in a distance radius of more than 5 to 20 km also have a decreasing level of mental health when compared to subjects who live in the previous distance radius and the peak of subjects who have the worst mental health is in subjects who live in the distance radius more than 20 to 50 km.

The results of this research show that the closer you live to the beach, the better your mental health. Subjects who live in a radius of less than 1 km have the highest level of mental health compared to subjects living in other distances. The further you are from the beach, the more your mental health level decreases.

This research is in line with previous research in several other countries. Research in England [15] for example, reporting that the closer to the beach the

better mental health. Research in Australia by [19] shows that those living less than 2 km from the shoreline have a lower level of depression compared to those living more than 50 km away from the coast.

However, there are differences in research results for people who live more than 50 km from the coastline. [19] stated that Australian people who live more than 50 km from the coastline have increasingly worse mental health. On the other hand, if in Indonesia people who live more than 50 km and less than 1 km from the coastline, their mental health level increases or the level of distress does not have a significant difference. There is a small difference when viewed from the mean value for people who live less than 1 km from the beach, which is (177.51) and people who live more than 50 km from the beach, which is (177.60), only has a difference of 0.09.

According to experts, the difference in mental health scores occurs due to the therapeutic effect of Thalasso therapy in the blue room [20] which stated that living in a wide blue area has a positive impact on mental health, it can relieve stress, anxiety, feelings of pressure and can create a feeling of calm. The feeling of calm arises due to the presence of coastal elements such as beach sand, sea breeze, sound of waves, sea water, wide blue open spaces. The blue open space also allows various physical activities to be carried out to release tension.

The therapeutic effect of Thalasso therapy is in line with the subject's statement in the open question item (What do they like about the beach?) that the majority of them feel calm from the natural sound of the waves, the sensation of playing in the water on the beach, the sound of the wind blowing which creates peace of mind and beautiful views What the beach offers has a very positive impact on mental health. Most Indonesian people enjoy going on holiday to the beach, apart from its natural beauty, they also aim to find a sensation of tranquillity while at the beach.

The low level of distress in people living more than 50 km from the coastline is perhaps due to the economic level being dominated by the upper middle class. [21] There was a statement that subjects who lived at a distance of more than 50 km did not like the beach. Researchers assume that distress in subjects who live more than 50 km from the beach tends to be low, even almost the same as subjects who live less than 1 km from the beach. This is because the economic level of subjects who live far from the beach is middle to upper and live in big city. [21] states that people who have a high economic status have a small risk of experiencing emotional mental disorders. It is likely that they can reduce stress or maintain mental health through other methods supported by their financial capabilities.

Subjects who lived at intervals of more than 50 km from the coast included those from the cities of South Tangerang, Bandung, Jakarta, Malang, Kutai Kartanegara, Berau and so on. The researchers also assumed that the intensity of going to the beach for subjects who lived more than 50 km from the beach was the lowest compared to other distance intervals. Wheeler et al. stated that people perceive that their stress will decrease with more frequent visits to the beach. [16]

The level of mental health that lives due to distress is low in subjects who live less than 1 km from the shoreline compared to other distance ratios, this is due to the therapeutic effect of Thalasso therapy. This is proven by the subject's statement stating that healing is free, there are many natural activities that can be done such as fishing, the sound of roaring waves is favoured by subjects who live less than 1 km from the beach. Thus, the researchers assume that in this group the subjects have a very high intensity of visiting beaches less than 1 km away. It is in these distance intervals that you get the greatest therapeutic

effect from Thalasso therapy which can reduce distress quickly. [16] So the average subject tends to have a high level of mental health due to very low distress.

Although previous research found that living near coastline can increase distress and well-being [9,10], this research found that hot temperatures in coastal areas do not have a significant impact on increasing distress, this is due to the therapeutic effect of Thalasso therapy which dominates in causing relaxation, improving sleep quality so as to minimize the emergence of distress. [22] In this study, researchers also had shortcomings in conducting research, mainly on the number of age groups, with subjects that were only dominated by the 19 to 40 year age group. So this research cannot see comparisons of mental health in certain age groups. Apart from that, this research also does not explore the subject's economic level, so it does not reveal complete information. However, this research is unique compared to previous research because the subject is in Indonesia. The advantage of this research has never been before in Indonesia and only exists in a few countries abroad. It is also worth noting that the subjects studied previously did not live in an archipelagic country like Indonesia.

Conclusion

There are several limitations of this study. Firstly, it has samples concentrated in Java Island and economically developed cities in Indonesia. This may skew the result and cloud the actual condition in the general population of Indonesian. Secondly, it has no comparative variables to control the dynamic relationship of the two main research variables and to better provide a rich understanding of the data.

The results of this research can be concluded that the closer you live to the coastline, the more mental health improves and the level of distress decreases. This is proven by the mean value on the mental health scale to

determine the level of distress, if you look at the graph the mean value at each interval the graph increases. However, when at intervals of more than 50 kilometres the graph decreases again, it is assumed by researchers that this is influenced by the economic level. So the researcher suggests that future researchers include information to determine the subject's economic level, to support more complete data and answer the assumptions in this research.

The implications of this research, especially for people who live more than 20 to 50 kilometres from the coast, have the lowest level of mental health based on the highest distress value. People can do activities that improve mental health, one of which is visiting the beach. It is hoped that the government can play a role in improving people's mental health welfare by recommending visits to the beach. Apart from that, the government is also expected to optimize facilities around the beach, namely by facilitating access to the beach and building adequate facilities around the beach such as public toilets, gazebos and culinary centers. With an active role from the government, it can improve the economy of communities around the coast and help improve mental health in the community.

Author Contribution

AR is the principal investigator, responsible for research proposals development, collection and analysis data, and wrote the manuscript. AS is responsible for reviewing research proposal and data analysis, reviewing manuscript, and preparing the manuscript for submission to this journal. AS provides the research idea and form the structure of the overall research process.

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