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DETERMINANTS OF TRANSMISSION COVID-19 IN SOUTH SULAWESI

Determinan penularan COVID-19 di Sulawesi Selatan

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ABSTRACT

Background: Corona Virus (COVID-19) is a new respiratory viral infectious disease that can cause illnesses ranging from the common cold to severe acute respiratory syndrome. Subsequently, as of May 31, 2022, the government of South Sulawesi reported 143,276 confirmed cases, 2,463 deaths, and 140,395 recovered patients. **Purpose:** To analyze the impact of behavior, travel history, and comorbidities on the incidence of COVID-19 in South Sulawesi. **Methods:** This is observational research with a cross-sectional study design and was conducted from January–April 2022 in 7 districts of South Sulawesi Province. A population of 650 respondents with a total sample of 161 patients confirmed positive and 189 suspected of having COVID-19. The Chi-square test and multiple logistic regression were used to analyze the data. **Results:** There was a relationship between travel history (p0.00; OR 2.19), knowledge (p0.03; OR 1.74), and actions (p0.00; OR 0.18) on the incidence of COVID-19. Additionally, no relationship was reported between comorbidities (p0.85), attitudes (p0.90), and level of knowledge (p0.08>(0.05) on the incidence of COVID-19. The most influential variable in the rapid spread was travel history, with an exp(B) value

of 2.19 CI (95%) (LL=1.26; UL=3.80). **Conclusion:** The results showed that travel history, knowledge, and actions made a major contribution to the spread of COVID-19 in South Sulawesi Province.

ABSTRAK

Latar Belakang: Virus Corona (COVID-19) adalah penyakit infeksi virus pernapasan baru yang dapat menyebabkan penyakit mulai dari flu biasa hingga sindrom pernapasan akut yang parah. Per tanggal 31 Mei 2022, Pemerintah Sulawesi Selatan melaporkan 143.276 kasus terkonfirmasi, 2.463 meninggal, dan 140.395 pasien sembuh. Tujuan: Menganalisis dampak perilaku, riwayat perjalanan, dan penyakit penyerta terhadap kejadian COVID-19 di Sulawesi Selatan. Metode: Penelitian observasional dengan desain cross-sectional yang dilakukan pada bulan Januari-April 2022 di tujuh kabupaten di Provinsi Sulawesi Selatan. Populasi penelitian sebanyak 650 responden dengan total sampel 161 pasien terkonfirmasi positif dan 189 suspek COVID-19. Analisis data menggunakan uji Chi-square dan regresi logistik berganda. Hasil: Terdapat hubungan antara riwayat perjalanan (p0,00; OR 2,19), pengetahuan (p0,03; OR 1,74), dan tindakan (p0,00; OR 0,18) terhadap kejadian COVID-19. Selain itu, tidak ada hubungan yang dilaporkan antara penyakit penyerta (p0.85), sikap (p0.90), dan tingkat pengetahuan (p0.08>(0.05) terhadap kejadian COVID-19. Variabel yang paling berpengaruh terhadap penyebaran cepat adalah riwayat perjalanan dengan nilai exp(B) 2,19 CI (95%) (LL=1,26; UL=3,80). Kesimpulan: Hasil menunjukkan bahwa riwayat perjalanan, pengetahuan, dan tindakan memberikan kontribusi besar terhadap penyebaran COVID-19 di provinsi Sulawesi Selatan.

INTRODUCTION

The new Coronavirus disease 2019 (COVID-19) is a global pandemic, which is caused by a virus known to contribute to illness with initial symptoms ranging from a common cold to severe acute respiratory syndrome, zoonotic pathogens that can be transmitted from animals to humans, and interactions between humans. This outbreak was first reported by the World Health Organization (WHO) on December 31, 2019, and declared a global pandemic on March 11, 2020. The rapidly spreading COVID-19 outbreak has created a global public health crisis. Healthcare workers are at the forefront of treating patients infected with the virus. Those who interact with or provide care for the patients are most at risk of developing this disease (Susan et al., 2022). The first confirmed case of COVID-19 in Indonesia was announced by the President of Indonesia during a press conference at the Presidential Palace on March 2, 2020, there were two cases in the Depok area. As of May 26, 2020, there were 23,165 occurrences. Nearly three months after the outbreak, COVID-19 cases in Indonesia started increasing very rapidly (Nissha, Ray, Samion, & Lukito, 2021). According to World Health Organization (WHO) on December 31, 2019, a case of cluster pneumonia of unknown etiology (cause) was reported in Wuhan City, Huberi Province, China. This case continued to increase until January 7, 2020, and finally, it was revealed that the etiology of the disease was a new type of coronavirus or known as a novel coronavirus (Moudy & Syakurah, 2020).

COVID-19 was first reported in Indonesia on March 2, 2020, with no fewer than two cases. Data as of March 14, 2021, reported that there were 1,414,741 confirmed cases and 38,329 deaths. Furthermore, based on data from the Task Force

for the Acceleration of Handling COVID-19 in South Sulawesi, as of June 7, 2021, South Sulawesi ranks first with sufferers outside Java with a total of 1,863,031 confirmed cases and 51,803 deaths (South Sulawesi data). Responding to this disease as of 7 June 2021, South Sulawesi, the third highest province in Indonesia places Makassar City as the epicenter of the spread of COVID-19 (Nur Ulmy Mahmud, Ria Qadariah Arief, Safruddin, 2022).

The covid-19 outbreak has now become a pandemic and has spread to various countries. The symptoms are fever, dry cough, and difficulty breathing, which can lead to severe respiratory complications. The coronavirus outbreak causes respiratory tract infections with mild flu-like symptoms in children severe pneumonia, and even death in the older population. Subsequently, comorbid medical conditions include diabetes, heart, lung, or kidney disease. (Vivek P Chavda, Aayushi B. Patel, Disha Vihol, Darsh D. Vaghasiya, Khandu Muhammed Saad Bashir Ahmed, Kushal U. Trivedi, 2020), (Przekwas & Chen, 2020).

Transmission of the virus can occur through droplets produced by an infected person's cough, susceptible individuals, fomites, aerosols produced during breathing and physiological respiration, and then touching a contaminated surface followed by hand-to-face contact, and possibly face-to-mouth or nose transmission (Przekwas & Chen, 2020). Limiting social distance between countries by curbing the transmission of the virus is a real political strategy. Assessing the differences between countries in the impact of social distancing restrictions on the incidence of COVID-19 is a difficult task, as some countries have not implemented such measures. Several other countries have enacted similar legislation, though the severity varies. Moreover, some countries have relaxed social distancing measures when cases are at their lowest (Prakash, Srivastava, Singh, Sharma, & Jain, 2022).

The increase in the number of cases occurred rapidly, requiring immediate treatment, COVID-19 can easily spread and infect anyone regardless of age. Efforts to break the chain of the spread of this virus require good understanding and knowledge from all elements, including the community. It is very important in order not to cause an increase in the number of cases. Public knowledge about this virus can be interpreted as a result of patient's knowledge of their illness to understand the disease, prevention, treatment, and complications that occurred (Mujiburrahman, Riyadi, & Ningsih, 2020).

Each individual has a behavior that is different from others, even including identical twins. Behavior does not always follow a certain sequence, and therefore the formation of positive behavior is not always influenced by positive knowledge and attitudes. Based on the basic theory developed by Lawrence Green, which stated that the health of a person or society is influenced by two main factors, namely behavioral and non-behavioral causes. The cause of the behavior is influenced by three factors, namely predisposing, supporting, and reinforcing factors. Subsequently, knowledge is the result of curiosity through sensory processes, especially in the eyes and ears of certain objects. It is also the most important domain in the formation of behavior. In addition to knowledge from the community, the attitudes and actions of community leaders or the government are able to describe their behavior in encouraging the community in prevention efforts. (Kasumawati, Ilmi, Hasanah, & Ismaya, 2022; Mujiburrahman et al., 2020).

One of the research locations, namely Luwu, North Luwu, East Luwu, and Palopo Regencies, is a border area with Southeast Sulawesi and Central Sulawesi and is a transmigration area in which the characteristics may likely affect the level of knowledge, and community action against COVID-19. Meanwhile, Wajo Regency has an area directly adjacent to Sidrap, Bone, and Soppeng, where the Wajo area is the main meeting point of the three regions and poses a high-risk factor for transmission. Additionally, Selayar Islands Regency is one of the regencies located in the South Sulawesi archipelago with a distance of about 3 hours by ferry from Bira port, Bulukumba, which is a risk factor for the high transmission of COVID-19 infection. The purpose of this research was to analyze the determinants of COVID-19 transmission, including knowledge, attitudes, actions, travel history, and comorbidities to the incidence of COVID-19 in South Sulawesi Province.

METHODS

This research was conducted in seven districts, including Luwu, East Luwu, North Luwu, Palopo, Wajo, Maros, and Selayar in South Sulawesi Province from January to April 2022. This is analytical observational research with a cross-sectional study design, and the population consists

of 650 respondents. The sample selection method was carried out by purposive sampling with inclusion criteria of (1) willingness to be a respondent, (2) residency in South Sulawesi Province, (3) areas with high COVID-19 cases, and (4) high community mobilization. A total sample of 161 respondents, positively confirmed patients, and 189 suspected COVID-19 patients were obtained. Additionally, sampling was set for 60 days through the distribution of the questionnaire offline.

In this research, the dependent variables were the travel histories of positive and suspected COVID-19 patients to various regions in South Sulawesi. The independent variables were the history of the illness that the patient had suffered from and variables of knowledge, attitudes, and actions related to the prevention of COVID-19. Data was collected using a COVID-19 investigative questionnaire (Puslitbang Biomedik and Basic Health Technology, Health Office, Health Research and Development Agency), as well as behavioral questionnaires to measure respondents' knowledge, attitudes, and actions. Subsequently, in-depth interviews with patients were carried out to obtain accurate information and observations directly from the field regarding travel history, comorbidities, knowledge, attitudes, and actions of confirmed and suspected COVID-19 patients. Data analysis was carried out using univariate analysis for descriptive statistics reported in the form of a frequency distribution. The bivariate analysis was used to discover the relationship between variables x and y; between variables one and variable y; Chi-square; and multiple logistic regression.

Ethics clearance was obtained from the Institutional Committee of the Muslim University of Indonesia (No. 5397/A/KEPK-UMI/XII/2021) before the beginning of the research.

RESULTS

Figure 1 shows that out of the four districts, namely Luwu, North Luwu, East Luwu, and Palopo City, the age group that dominated among the respondents was adults (13.70%) in North Luwu. The highest female gender (10.50%) was in North Luwu Regency and Palopo City. The highest educational status was higher education (12.50%) in North Luwu. Working (13.70%) is the most common employment status in North Luwu. The highest income was low income (8.50%) in North Luwu. The highest status did not have a travel history (12%) in North Luwu, the highest duration of exposure was not at risk (7%) in North Luwu, the exposure distance was at risk (8.50%) in North Luwu, the highest clinical symptoms were absent (13.70%) in Palopo City, no comorbidities (14%) in Luwu, good knowledge level (13.70%) in North Luwu, In Luwu Regency and Palopo City, good attitude dominates (11.40%), while good deeds dominate (13.40%).

Figure 2 shows that the highest age of respondents in Selayar Regency was adult, the highest gender was female (11.40%) in Maros Regency, and a low level of education (9.70%) in Wajo Regency, an occupation that dominates namely working status (14%) in Selayar Regency, the highest low income was reported (13.40%) in Wajo Regency, the highest travel history was found (10.80%) in Selayar, the highest risk of exposure was determined (10.80%) in the agency Selayar, exposure distance at risk (37%) was reported in Selayar, highest clinical symptoms (14.20%) in Selayar, highest no comorbidities (13.40%) in Selayar, highest Covid suspect status (8.20%) in district Wajo, the level of good knowledge dominates (10.80%) in Wajo and Selayar districts, the good attitude that dominates (13.10%) in Wajo, good actions dominate (8%) in Wajo and Selayar regency.

Table 1 shows that the results of the Fisher-Exact test analysis obtained were p0.00 <0.05, it can be concluded that there is a significant relationship between the duration of the trip with confirmed positive patients and suspected COVID-19 in 7 sub-districts of South Sulawesi Province. Therefore, based on the Fisher-Exact test analysis, p 0.85 < 0.05, it can be concluded that there is no significant relationship between comorbidities and those confirmed positive and suspected of having COVID-19. The fisher-exact test results obtained p0 0.08 <0.05, it can be concluded that there is a significant relationship between knowledge and those confirmed positive and suspected of having COVID-19 in 7 districts in South Sulawesi Province. Additionally, the fisher-exact test results obtained p0, 90 < 0.05, it was concluded that there is no relationship between attitudes, the fisher exact test results obtained p0.00 <0.05, it can be concluded that there is a relationship between actions with someone who is confirmed positive and suspected of COVID-19.

The analysis continued with multivariate analysis to find out the variables that contributed greatly to the transmission of the COVID-19 disease. The steps are:

STEP 1

The Most Influential Variable

  a   Travel history variable with odd ratio of 2.192 and value (p-value) of 0.00 <0.05).

  b   Knowledge variable with an odd ratio of 1.741 with a value (p-value) of 0.03 <0.05)

  c   Action Variable with an odd ratio of.

  d   0.18 with a value (p-value) of 0.00 <0.05).

STEP 2

  a. The travel history variable has a Sig Value. (p-value) of 0.00 <0.05) and it was concluded that travel history had a partial effect on the incidence of COVID-19 with an Exp (B)/ Odd Ratio of 2.19.

  b. Comorbid variables have a Sig value. (P-value) of 0.56 >0.05) it was concluded that comorbidity had no partial effect on the incidence of COVID-19 with an Exp (B)/ Odd Ratio of 0.79.

  c. The Knowledge Variable has a Sig Value. (p-value) of 0.02 <0.05) and it was concluded that knowledge had a partial effect on the incidence of COVID-19 with an Exp (B)/ Odd Ratio of 1.74.

  d. The action variable has a Sig Value. (p-value) of 0.00 (<0.05) and it was concluded that the action had a partial effect on the incidence of COVID-19 with an Exp (B)/ Odd Ratio of 0.18.

Travel history is one of the five variables studied (comorbidities, knowledge, attitudes, and behaviors) that have a greater influence on the incidence of COVID-19 than any other.

Table 1.

Variable Relationship Analysis with People Who Care Confirmed Positive Suspect COVID-19 in 7 Districts of South Sulawesi

| Variable	COVID-19				Total		P value
	Positive		Suspect				
	n	%	n	%	n	%	
Travel History							
Yes	75	21.40	55	15.70	130	37.10	0.00
No	86	24.60	134	38.30	220	62.90	
Comorbid							
Yes	17	4,90	18	5.10	35	10.00	0.85
No	144	41.10	171	48.90	315	90.00	
Knowledge							
Yes	79	22.60	75	21.40	154	44.00	0.08
No	82	23.40	114	32.60	196	56.00	
Attitude							
Good	109	31.10	130	37.10	239	68.30	0.90
Enough	52	14.90	59	16.90	111	31.70	
Action							
Good	60	17.10	144	41.10	204	58.30	0.00
Enough	101	28.90	45	12.90	146	41.70	

Table 2.
Multivariate Variable Analysis of People Who Are Confirmed Positive and Suspected COVID-19 in 7 Districts of South Sulawesi

	Variable	B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Travel history	.78	.28	7.81	1	.00	2.19	1.26	3.80
	Comorbid	-.23	.40	.33	1	.56	.79	.35	1.75
	Knowledge	.55	.25	4.60	1	.03	1.74	1.04	2.89
	Attitude	.01	.28	.00	1	.97	1.01	.57	1.78
	Action	-1.67	.25	42.82	1	.00	.18	.11	.31
	Constant	1.01	1.09	.86	1	.35	2.76		
Step 2[a]	Travel history	.78	.26	8.57	1	.00	2.19	1.29	3.72
	Comorbid	-.23	.40	.33	1	.56	.79	.35	1.75
	Knowledge	.55	.24	5.14	1	.02	1.74	1.07	2.82
	Attitude	-1.66	.24	46.32	1	.00	.18	.11	.30
	Action	1.01	1.09	.86	1	.35	2.76		
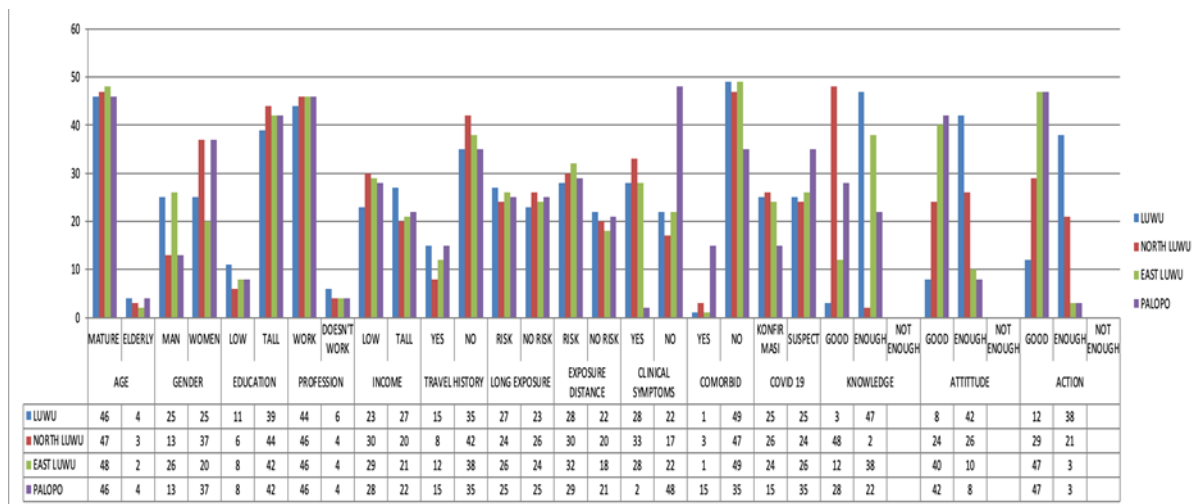
Figure 1. Demographic Characteristics and Respondent Variables 4 Districts
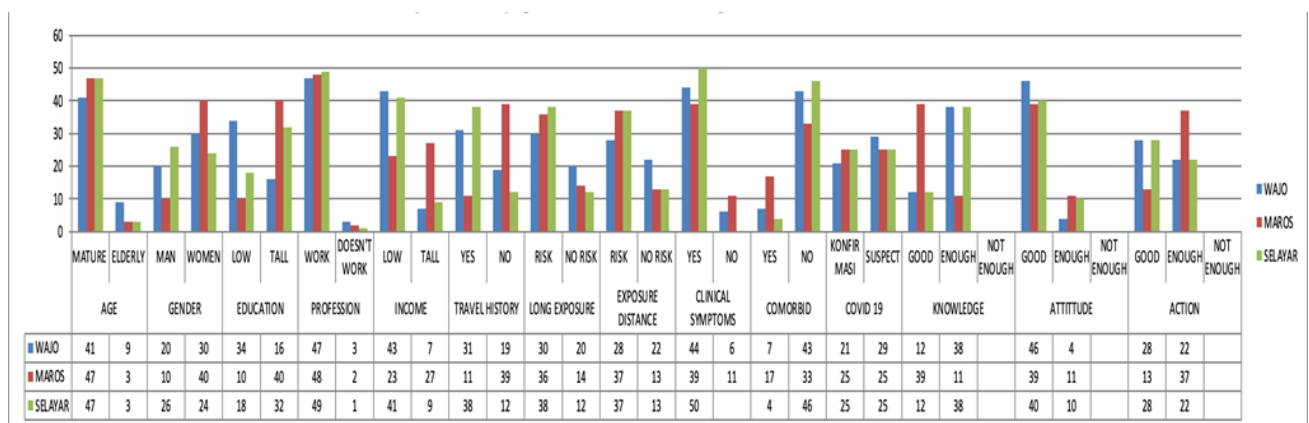
Figure 2. Demographic Characteristics and Respondent Variables 3 Districts

DISCUSSION

Attitude

States of mind are shaped by a self-evaluation process that is influenced by a variety of factors, including cognitive, emotional, motivational, and behavioral elements. Information and mental states are important areas that can affect a person's behavior (Linawati et al., 2021). Al-Hanawi et al., (2020) explained that Saudi Arabian society showed that the attitude of the citizens was quite good towards the prevention of COVID-19. Knowledge about the disease will affect a person's attitude, and this will be the beginning of getting health education, knowing the causes and sources of disease transmission, increasing the likelihood that people will become more aware of the spread of infectious diseases, and taking preventive measures to slow down transmission. According to social psychology, attitude is closely related to a person's level of knowledge. Moreover, a person's attitude towards an object reflects their knowledge of that object (Al-Hanawi et al., 2020; Zhong et al., 2020).

Travel History

This research shows that there is a significant relationship between travel history and people confirmed to have or suspected to have COVID-19. It is closely related to the coronavirus that causes severe acute respiratory syndrome (SARS) which was endemic in Hong Kong in 2003 (Ceraolo & Giorgi, 2020; Diah Handayani, Dwi Rendra Hadi, Fathiyah Isbaniah, Erlina Burhan, 2002), until the WHO named it the novel coronavirus (nCoV19) (Zhou et al., 2020).

Soon after, reports of people with travel history from Wuhan City and China, namely South Korea, Japan, Thailand, the United States, Macau, Hong Kong, Singapore, Malaysia to a total of 25 countries including France, Germany, United Arab Emirates, Vietnam and Cambodia started surfacing. The threat of a pandemic is even greater when multiple cases show human-to-human transmission to doctors and medical staff treating patients without a history of traveling to closed markets (Zhou et al., 2020). Another report appears to have been shared with companions of Chinese visitors to Japan, along with other evidence of transmission among the patient's household contacts outside of China from confirmed patients who traveled together from Wuhan to their accommodation in the United States. This coordinated human-to-human transmission occurred in an exceptional increase in the number of cases until after January 2020, when there was an increment of 2,000 affirmed cases in 24 hours. On January 2020, WHO announced a Worldwide Crisis status for this case of corona infection, and on February 11, 2020, WHO named it COVID-19 (Hoffman et al., 2020; Menachery, 2020).

In line with research conducted by Ghiffari (2020), it shows that the spread of the infectious disease COVID-19 is also influenced by population structure and mobility as a social vulnerability in the face of the outbreak which has spread rapidly throughout the world as a result of human travel and causes severe illness and death. Subsequently, it is important to understand the various measures to control human mobility and virus transmission (Fang, Wang, & Yang, 2020).

To determine the effect and complete a diagnosis, fourteen days was the incubation period of the virus. Close contact is an individual who has physical contact or is in the same room with a patient suspected of having COVID-19, contacts with fellow health workers while at work (within a 1-meter radius with cases without using health protocols). Close contacts are categorized into 2, namely: Low-risk close contacts, a situation when an individual is in contact with a patient's case under surveillance. High-risk close contact is a situation when an individual is in contact with a confirmed or probable case (Wahyu Setyarini & Sari Dwianggimawati, 2021).

Comorbid

Comorbidities were reported as significant predictors of morbidity and mortality. Many factors can cause anxiety in a person in the face of Covid-19, including comorbidities, which is a disease that requires serious attention. This is because people with comorbid diseases are susceptible to transmission of the virus and can show more severe manifestations than people without congenital diseases (Puspita, Rozifa, & Nadhiroh, 2021). Most deaths occur in elderly patients with congenital diseases such as cardiovascular, hypertension, diabetes mellitus, and Parkinson's (Adhikari et al., 2020).

The results of the analysis show that there was no significant relationship between comorbid diseases and people who were confirmed positive or suspected of having COVID-19. n line with research conducted by Roeroe, Sedli, & Umboh (2021), the results showed that 11.20% of the patients suffer from diabetes mellitus (Roeroe et al., 2021). In addition, hypertension is also the most common comorbid in patients, and this leads

to an increase in blood vessels. A person with heart and blood vessel problems is believed to have low body power, and therefore viral infections can be more deadly (Rifiana & Suharyanto, 2020).

CONCLUSION

The results showed that travel history, knowledge, and actions greatly contributed to the spread of COVID-19 in South Sulawesi Province. Subsequently, policy-holders are advised to pay attention to travel history in endemic areas, knowledge, and actions to prevent the transmission of COVID-19 in the community in South Sulawesi Province.

CONFLICT OF INTEREST

This research has no conflict of interest because it was carried out by a team and the results have no negative impact on policymakers at the location and instead become input for policymakers. This research was fully funded by the team and received no support from other parties.

AUTHOR CONTRIBUTIONS

M: Concept, design, and methodology for research writing NUM: data analysis and revision of research concepts. NJ: revision of research concepts. MS: field observations. L: observations in the field SHM: Questionnaire distribution and direct interviews AAS: distributing questionnaires and direct interviews.

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