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Research Article

Analysis of the Relationship Between Hospital Ownership and Google Maps Star Ratings: A Case Study of Regional General Hospitals (RSUD), Private Hospitals, and Muhammadiyah Hospitals (RSM) in East Java

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ABSTRACT

The Muhammadiyah Hospital network (RSM) is a religious non-profit oriented facilities in Indonesia which emphasizing ethical or faith-based considerations, in approach to providing services. RSM faces the challenge of excelling compared to its competitors, including Regional General Hospitals (RSUD) and other private competitor hospitals. This study aims to examine the relationship between hospital ownership status and Google star ratings among hospitals in East Java. A cross-sectional study was conducted involving 31 RSM, 19 RSUD, and 20 private competitor hospitals, which were compared in their respective cities. Kruskal-Wallis test was performed to compare the Google rating between each ownership, and simple logistic regression was performed to examine the association between hospital ownership and Google star rating. Of 31 regions, private hospitals (both competitor and RSM) had the highest rating in 22 regions when compared in their respective region. Private competitor hospital had the highest median (4.2 (3.9-4.7)), followed by RSM (4.1 (3.1-4.7)) and RSUD (4.0 (2.8-4.8)). Generally, a significant difference was found between RSUD and private competitor hospital ($p<0.05$), while between RSM and private competitor or RSUD were not significant. Logistic regression showed a significant association between hospital ownership and Google rating, with being a private competitor being likely to have a higher rating compared to RSUD (OR (95% CI): 8.10 (1.46-45.06)). In conclusion, our findings suggest hospital ownership had significant association with Google ratings, specifically between private competitor and public hospitals. While RSM didn't have any significant association although they tend to have higher ratings to RSUD.

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INTRODUCTION

Competition among hospitals in East Java is growing increasingly fierce, especially amid stagnation in the number of National Health Insurance (BPJS) participants. In the dynamic healthcare landscape of Indonesia, East Java plays a crucial role in driving its progress. Increasing healthcare facilities, including general and specialized facilities, East Java boasts a high number of hospitals in the country (Heywood & Harahap, 2009). These hospitals are owned by different entities that have distinct priorities that influence healthcare delivery and ultimately, the quality of care. For instance, public hospitals often prioritize accessibility and broad service offerings, while private hospitals may focus on specialized care and customer service (Mosadeghrad, 2014). Similarly, socio-religious hospitals like Muhammadiyah Hospital are non-profit oriented facilities which incorporate the mission of their organization, emphasizing ethical or faith-based considerations, in their approach to providing services. They face the challenge of excelling compared to their competitors, especially amid a stagnation in the number of National Health Insurance (BPJS) participants (Ambarwati & Pamungkas, 2024).

Different ownerships contribute to influencing decision-making, thus affecting hospital performance (Kuntz et al., 2016). Patient satisfaction reflects public perception that corresponds to the quality of care with regard to different establishments. Their feedback should be responded to properly, or else it will make the hospital's image worse and affect individual experience (Ferreira et al., 2023). Star ratings on Google Maps have now become a crucial factor influencing patients' choices and, as such, serve as a relevant real-world metric for assessing hospital competitiveness (Davlyatov et al., 2023). These ratings are typically based on user reviews, which can provide valuable insights into the overall quality and performance (Mathayomchan & Taecharungroj, 2020). Given this condition, public and private hospitals are competing with each other to ensure their sustainability of existence. As non-profit oriented facilities, Muhammadiyah Hospital network (RSM) faces the challenge of excelling compared to its competitors, including Regional General Hospitals (RSUD) and other Private for-Profit (PFP) hospitals (Tatang & Mawartinah, 2019).

The study of hospital ownership has gained increasing relevance for several reasons. Various studies have examined how hospital ownership impacts different aspects of hospital performance, such as the quality of care, patient outcomes, and patient satisfaction. Previous studies have shown mixed findings regarding the relationship between hospital ownership and quality of care, with some studies indicating that for-profit hospitals may have better financial performance and patient outcomes (Liu et al., 2020; Moon & Shugan, 2020). The relationship between hospital ownership and quality of care is complex and not easily generalized. These factors should be identified and optimized in order to ensure qualified national health delivery (Atala & Kroth, 2020).

There have been few studies conducted on the relationship between hospital ownership and Google Maps star ratings in East Java, despite the presence of numerous hospitals in the region to serve a region with high population density. This study aims to examine the relationship between hospital ownership status among hospitals in East Java, including Regional General Hospitals, Private Hospitals, and Muhammadiyah Hospitals as non-profit facilities, to their Google star ratings.

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METHOD

This was an observational study with a cross-sectional design. This study involved 78 general hospitals in East Java, Indonesia, which were divided into RSM, RSUD, and private competitor hospital groups. All hospitals in East Java, Indonesia, were listed, and then the private hospital with the highest rating in a city was taken to the private competitor group. The Google star rating of each hospital was taken from https://maps.google.com on January 29th, 2024. Each RSM was compared qualitatively with its corresponding RSUD and top-rated private competitors in the same region. The rating was presented on a 1-5 scale ranging from poor to very good. It was categorized as higher than or equal to 4 and less than 4. Normality test using Kolmogorov-Smirnov was performed, followed by Kruskal-Wallis test to compare the rating between ownership groups, with a p-value <0.05 considered as statistically significant. Simple logistic regression was performed to examine the association between hospital ownership and Google star rating. Analysis was conducted using Statistical Package for the Social Sciences (SPSS) for Windows version 25.0 (SPSS Inc., Chicago, III., USA).

RESULT

We examined a total of 70 hospitals in East Java, Indonesia, which consist of 31 Muhammadiyah hospitals distributed in the province, with their corresponding RSUD and private competitor hospitals being 19 and 20, respectively. Of them, 64.5%, 52.6% and 90.0% had Google star rating more than or equal to 4 in RSM, RSUD, and private competitor hospitals, respectively. A total of 49 and 21 hospitals were distributed in district and city section, respectively. Hospital characteristics were shown in Table 1.

Of 31 regions, private competitor hospital had the highest rating in 12 regions (38.7%), RSUD in 6 regions (19.4%), RSM in 10 regions (32.2%), 2 regions (6.5%) had equal rating between RSM and private competitor hospital, and 1 region (3.2%) between RSUD and private competitor hospital. Qualitatively, in Surabaya, Gresik, Tuban, Blitar, Tulungagung, Nganjuk, Jombang and Banyuwangi, private competitor hospital was consistently had the highest rating. In Bojonegoro, Mojokerto, and Ponorogo, RSM had the highest rating. In Sidoarjo, Malang, and Lumajang, RSUD had the highest rating. While in Lamongan and Kediri, ratings were varied. The rating of each hospital with its relevant competitors was shown in Table 2. Among these hospitals, RSKDR had the highest rating, while RSNGJK was the lowest. The private competitor hospital had the highest median rating (4.2 (3.9-4.7)), followed by RSM (4.1 (3.1-4.7)) and RSUD (4.0 (2.8-4.8)), as shown in Table 1. When generally compared, the difference between groups was statistically significant (p<0.05). Post-hoc analysis showed specifically the significant difference was located between RSUD and the private competitor hospital. Simple logistic regression showed that being a private competitor hospital was significantly associated with a higher Google star rating compared to being in RSUD, with OR (95% CI) 8.10 (1.46-45.06) (p<0.05), whilst the association between RSM and RSUD was not significant, as shown in Table 3.

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Table 1. Hospital Characteristics

	Google Rating (n (%))		Median (min-max)	p-value
	≥4	<4		
Ownership				
RSM (n=31)	20 (64.5%)	11 (35.5%)	4.1 (3.1-4.7)	0.036*
RSUD (n=19)	10 (52.6%)	9 (47.4%)	4.0 (2.8-4.8)	
Private competitor hospital (n=20)	18 (90.0%)	2 (10.0%)	4.2 (3.9-4.7)	
Region				
District (n=49)	33 (67.3%)	16 (32.7%)	4.1 (2.8-4.8)	0.736
City (n=21)	15 (71.4%)	6 (28.6%)	4.2 (3.1-4.7)	

SD: Standard deviation, RSM: Rumah Sakit Muhammadiyah (The Muhammadiyah Hospital Network), RSUD: Rumah Sakit Umum Daerah (Regional Public Hospital)

*p<0.05 was considered statistically significant

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Table 2. Hospital Google Rating Profile in Each City Between Ownership Groups

City	RSM	Rating	RSUD	Rating	Private competitor hospital	Rating
Surabaya	RSSBY	3.6	RSSWD	3.9	RSSILO	4.6
Gresik	RSMG	4.6	RSIBSN	4.1	RSSG	4.6
	RSSKP	4.3	RSIBSN	4.1	RSSG	4.6
Lamongan	RSML	4.7	RSSGR	4.1	RSNULM	4.1
	RSKLK	4.6	RSSGR	4.1	RSNULM	4.1
	RSBBT	3.1	RSSGR	4.1	RSNULM	4.1
	RSUBBT	4.4	RSSGR	4.1	RSNULM	4.1
Bojonegoro	RSSUMB	4.4	RSSBRJ	4.0	RSMSLM	4.1
	RSIABJ	4.2	RSSSDR	3.4	RSMSLM	4.1
	RSKLTD	4.6	RSSSDR	3.4	RSMSLM	4.1
Tuban	RSTBN	3.8	RSRKTN	3.7	RSNUTB	4.5
Sidoarjo	RSSK	4.1	RSSDJ	4.4	RSDTSY	4.0
	RSATLG	3.9	RSSDJ	4.4	RSDTSY	4.0
Mojokerto	RSHM	4.7	RSWHD	4.2	RSGTOL	4.4
Malang	RSIAM	4.2	RSSAM	4.6	RSPTNM	4.1
	RSUMM	3.7	RSSAM	4.6	RSPTNM	4.1
Kediri	RSMAD	4.6	RSGBR	3.8	RSLRBY	4.1
	RSKGRH	3.9	RSKDR	4.8	RSAMLA	4
	RSSM	3.9	RSGBR	3.7	RSBKDR	4.6
Blitar	RSUBLT	4.3	RSMRDW	3.1	RSBDRH	4.4
	RSIBLT	4.0	RSMRDW	3.1	RSBDRH	4.4
Madiun	RSAMDN	4.0	RSSDNM	4.5	RSSTCL	3.9
Ponorogo	RSAPNG	4.1	RSHRJN	3.3	RSDRMY	3.9
	RSMPNG	3.9	RSHRJN	3.3	RSDRMY	3.9
Tulungagung	RSMTLG	3.2	RSISKA	3.2	RSMDN	4.0
Nganjuk	RSAGJK	4.0	RSNGJK	2.8	RSBNGJ	4.4
Jombang	RSMJMB	4.0	RSJMB	3.7	RSMJTO	4.5
	RSMJG	3.7	RSJMB	3.7	RSMJWN	4.1
Banyuwangi	RSFBWI	4.2	RSBLMG	4.2	RSYSMN	4.7
	RSMRGJ	3.7	RSBLMG	4.2	RSYSMN	4.7
Lumajang	RSMLMJ	4.5	RSHRYT	4.4	RSWJKM	4.3

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Table 3. Simple Logistic Regression Analysis

	Google star rating		β	OR (95% CI)	p-value
	≥4	<4			
Hospital ownership					
Private competitor hospital	18	2	2.09	8.10 (1.46-45.06)	0.017
RSM	23	11	0.49	1.64 (0.51-5.24)	0.407
RSUD	20	11	-	(reference)	-

OR: odds ratio, CI: confidence interval

DISCUSSION

Google ratings act like a real-world metric reflecting public perception of a public service, in this case, was healthcare facility. These ratings are publicly accessible, thus could be used as a parameter of health quality service and might influence patients' choices (Davlyatov et al., 2023). Our study showed the distribution of Google star ratings amongst hospitals in East Java, Indonesia, based on their ownership. In general, a higher rating was significantly associated with private competitors compared to RSUD, but not to RSM. However, it varied when the rating was ranked based on its ownership according to their region. These results suggest that private competitor hospitals tend to have high ratings but are not always the best hospital in a city. Nevertheless, private hospitals (both competitors and RSM) are likely to have a higher rank when compared to public hospitals.

Previous research conducted by Mutiarasari et al. (2021) in Central Sulawesi showed that patients who sought treatment from a private hospital tend to have a higher level of satisfaction in all aspects than those from a public hospital. These aspects were requirements, procedure, service time, fees/rates, product specification, competency, attitudes, notice of services, and handling complaints (Mutiarasari et al., 2021). Rivai et al. (2020) and Akbar et al. (2020) also reported that patients at private hospitals had significantly higher satisfaction compared to patients at public hospitals (Akbar et al., 2020; Rivai et al., 2020). This result was in line with a study conducted by Setyawan et al. (2020), who found higher levels of biological and psychological provision, and higher correlation to loyalty in private primary health care facilities compared to the public (Setyawan et al., 2020). Both of the studies were conducted in Indonesia and might represent the population more. It should be kept in mind that these results might vary depending on other variables such as hospital location, inpatient or outpatient service, accreditation, and patient class. Wulandari et al. (2021) showed that patients' satisfaction with inpatient service in public hospitals increased significantly according to their insurance class, regardless of length of stay (Wulandari et al., 2021).

In contrast to Perotin et al. (2013), who reported that hospital ownership in England didn't affect overall patients' reported experience (Pérotin et al., 2013). A systematic

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review conducted by Herrera et al. (2014) explained the superiority of ownership in more specific analyses. Public hospitals tend to have better competence when dealing with such complicated cases. On the other side, private hospitals (including profit and non-profit) tend to have better responsiveness, clinical practice, and drug availability(Berendes et al., 2011; Herrera et al., 2014). Better healthcare access was also seen in private facilities rather than public facilities. Compared to private non-profit hospitals (PNFP), PFP hospitals were associated with higher mortality, higher payment care, and profit margin. However, despite this diversity, ownership didn't seem to affect patients' satisfaction significantly (Herrera et al., 2014).

Muhammadiyah Hospital operates under the ownership of the Muhammadiyah organization - a social religious organization which incorporates the mission of their organization, emphasizing ethical or faith-based considerations, in their approach to providing services (Ambarwati & Pamungkas, 2024). Ruhyanudin et al. (2022) and Rosyidah et al. (2018) showed similar results in which 54.4 % and 64.3% of patients in Muhammadiyah Hospital were satisfied with the hospital care, respectively (Rosyidah et al., 2018; Ruhyanudin et al., 2022). Haqiqi and Purwanda (2023) reported above 84% self-reported experience towards nurse care in terms of responsiveness, assurance, and empathy in Muhammadiyah Hospital Bandung. Still, there are a few things that need to be improved, such as, doctor's arrival according to schedule and greetings given by the staff (Haqiqi & Purwanda, 2023). Nevertheless, studies explaining hospital performance and quality of care in Muhammadiyah Hospital are still lacking. At last, Muhammadiyah Hospitals should focus on factors that directly influence public ratings in alignment with their ownership mission and objectives.

Different ownership might have an impact on hospital performance through different resources, financial management, and company orientation. A study in Bangkok showed physicians in PNFP hospitals were more likely to give a better explanation both in inpatient and outpatient services, followed by PFP and public hospitals (Tangcharoensathien et al., 1999). Whereas in China, in-hospital mortality and total medical expenses were higher in PNFP hospitals, followed by PFP and public hospitals (Xue et al., 2023). The difference might occur due to the higher severity of patients admitted to private hospitals at that time. After all, these varied results could be subjected to several confounding factors. The effect of ownership on hospital performance and quality of care. Similar quality of care was observed between public and private hospitals after adjusting for unobserved patient heterogeneity and confounding variables (Moscelli et al., 2017; Pérotin et al., 2013). Regardless of these varying results, understanding in depth organizational decision making, orientation, and marketing strategy will give a better perspective.

The burden of disease in Indonesia is increasingly complex as the population tends to grow over time. To combat the epidemic of both communicable and non-communicable diseases, Indonesia had to allocate large funds in the health sector, including regulation of the health system, establishment of public health facilities, and national health insurance, namely *Jaminan Kesehatan Nasional* (JKN) (Moeloek, 2017). Several private organizations also build their facilities both to manage medical issues in a certain region and to make a profit. Some of them could provide more advanced management, but at higher expenses. Eventually, vertical referral to public hospitals is usually done due to more coverage for further management, leading to a higher number of complex cases handled by public hospitals. The

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rapid development of research and technology also contributes to high funding for diagnostic and treatment processes, causing an overload in public hospitals due to high demand and more financial coverage (Moscelli et al., 2017).

Indonesia comprises of 9.36% population in the poor category based on the national poverty line in 2023. Utilization of JKN in public health facilities has been used widely despite of social status. Although using national health insurance, approximately every fifth patient treated still incurred out-of-pocket expenditure, especially in medicine (Couturier et al., 2022). Patients often felt waiting long for short opening hours in primary health care. Moreover, they had a lack of trust in primary care doctors compared to specialists in the hospital (Ekawati et al., 2017). In a previous systematic review, patients who were satisfied with national health insurance care ranged from 40%-80%, from the lowest to highest were assurance, responsiveness, reliability, and empathy, respectively (Nurmawati & Pramesti, 2021). It was interesting that there were no significant differences in out-of-pocket expenditures between subsidised and non-subsidised participants, although the subsidised group tended to spend less (Couturier et al., 2022). Considering this kind of behaviour, hospital ownership, and their performance, it is logical to conclude that private hospitals are somehow more favorable in Indonesia.

Hospitals are facing challenges in managing things between their resources, i.e., facility, employee payment, and giving the best performance to ensure appropriate patient care. Several determinant factors related to patients' satisfaction have been identified, including hospital ambience, service delivery, interior decor, and cleanliness (Ai et al., 2022). Communication with medical staff, especially physicians, has been identified as the most significant factor influencing patients' satisfaction (Gavurova et al., 2021). These reports implied the spectrum of quality of care was broader than we might think. Given that the patient's judgement has started since entering the hospital that even a little issue could affect their perception. Another report has shown that better hospital performance in terms of mortality, readmission, length of stay, central line–associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI), and surgical site infection was associated with higher patients' reported experience (Abdalla et al., 2023). Additionally, a better experience was also associated with increased utilization, a higher proportion of elective patients, and higher revenue. They tend to be more loyal when it comes to elective cases and make a good recommendation regarding the hospital (Giese et al., 2023; Lei & Jolibert, 2012). However, not only the hospital but patients' characteristics a contribute to determining their own experience; being a female was associated with a less good reported experience, while older people reported a better experience (Pérotin et al., 2013). Giving a perspective to sustain a long-term impact between quality of care and profitability, studying demographic characteristics and local culture is mandatory for a hospital to constitute an optimal marketing strategy.

Google rating is one of the online platforms widely used for society to give reviews and ratings regarding hospital care. Other platforms, such as Facebook and Yelp, were also used, but they were uncommon in Indonesia. Crowdsourced rating in Google was modestly correlated to patients' satisfaction but not clinical components that need medical expertise assessment, such as safety of care, surgery, and readmission (Ramasubramanian et al., 2021; Synan et al., 2021). Another study

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showed the hospital's Google rating was highly correlated to patients' experience (Davlyatov et al., 2023). Furthermore, Stanley et al. (2023) reported that Google rating could be used as a tool to predict hospitals with lower infection and mortality rates during the *coronavirus disease*-19 (COVID-19) pandemic (Stanley et al., 2023). In contrast, several studies reported weak or no correlation between Google ratings and patients' satisfaction (Ellenbogen et al., 2022; Zitek et al., 2023). These varying results were attributed to subjectivity and uncontrolled confounding variables, implying that their reviews should be cautiously interpreted.

In other industries, such as food and beverages, a rating higher than 4 was considered good business. Healthcare services should be more sensitive as they have higher consumer expectations related to greater exposure and a therapeutic relationship. A few studies also showed 4.1 and 4.2 as the mean rating for business in Google Maps. In many regions, a Google rating higher than 4 was also associated with 10% top-tier hospitals (Li & Hecht, 2021; Wijaya et al., 2023; Zitek et al., 2023). However, hospitals should be considerate not only in the numbers but also when handling such controversion reviews. Despite its subjectivity, Google reviews are publicly accessible and easy to use as an early step for patients to collect information and choose their destination. Hence, the hospital should pay attention to this platform as a first line defense in maintaining and improving the hospital's image, giving a good first impression before patients enter the hospital.

The study is subject to several confounding variables that could influence the results. These include the geographic location of the hospitals, the specialized services they offer, active marketing efforts to manage online presence, staff-to-patient ratios, and the socioeconomic factors related to the hospital's location. These variables could independently affect the Google Map ratings and are not controlled for in the current study. It is important to note that the impact of hospital ownership on the quality of care and patient outcomes may vary depending on factors such as the region, data source, and the period of analysis (Liu et al., 2020). Given these limitations, including the potential influence of uncontrolled confounding variables, future research could include these variables for more comprehensive analyses, with larger samples. In terms of research, a multi-layered approach incorporating confounding variables, qualitative methods, longitudinal data, and comparative studies could provide a more nuanced understanding of the factors influencing hospital ratings.

CONCLUSIONS

In conclusion, our findings suggest that hospital ownership had a significant association with their Google ratings, specifically between private competitors and public hospitals. While RSM didn't have any significant association, although they tend to have higher ratings than RSUD. Nevertheless, hospitals should be aware of various factors related to quality of care, even to the smallest aspects, other than focusing only on ownership. However, hospitals should also consider Google star ratings to give a good impression, thus improving the hospital image. This study could serve as a foundation for further research, particularly regarding factors that may influence star ratings. Furthermore, there is significant practical potential within the context of hospital management, particularly for RSMs aiming to enhance competitiveness and service quality.

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