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Sociocultural Determinants of Clinical Autopsy Refusal and Their Medicolegal Impact on Diagnostic Accuracy in Indonesian Tertiary Hospitals

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A B S T R A C T

Introduction: Clinical autopsy refusal remains a critical barrier to diagnostic quality assurance and medicolegal accountability in Indonesian hospital medicine. This retrospective cohort study enrolled 324 consecutive inpatient deaths across three tertiary referral hospitals in Palembang, South Sumatra (January 2019 – December 2023), to characterize sociocultural determinants of autopsy refusal and their impact on diagnostic accuracy and time-to-correct-diagnosis. **Methods:** The primary outcome was next-of-kin refusal of clinical autopsy consent; secondary outcomes included diagnostic discrepancy classified by the Goldman system, and time-to-correct-diagnosis analyzed by Kaplan-Meier survival analysis with log-rank testing. Multivariate logistic regression with bootstrap-derived confidence intervals identified independent predictors of refusal. **Results:** The overall autopsy refusal rate was 84.0% (272/324). Independent predictors were Javanese ethnicity (OR 3.64, 95% CI 1.77–7.48; p<0.001), Islamic religious affiliation (OR 2.49, 95% CI 1.42–4.37; p=0.001), primary or no formal education (OR 2.36, 95% CI 1.19–4.68; p=0.014), age per 10-year increment (OR 1.18, 95% CI 1.05–1.33; p=0.006), and low household income below 2 million IDR (OR 1.76, 95% CI 1.00–3.10; p=0.049). The model demonstrated good discrimination (C-statistic 0.81) and calibration (Hosmer-Lemeshow p=0.43). Major diagnostic discrepancy (Goldman Class I–II) occurred in 26.1% of the refused cohort versus 13.5% in the consented cohort (p=0.047). Median time-to-correct-diagnosis was 19 days (95% CI 15–24) in the refused group versus 5 days (95% CI 3–8) in the consented group (log-rank p<0.001). **Conclusion:** These findings provide robust evidence for the medicolegal urgency of addressing sociocultural barriers to autopsy consent through culturally sensitive policy reform in Indonesia.

1. Introduction

Clinical autopsy has served as the foundational instrument of diagnostic quality assurance in hospital medicine for over two centuries, providing irreplaceable pathological verification of antemortem diagnoses, detecting conditions missed during clinical care, and generating data essential for both epidemiological surveillance and medicolegal adjudication.[1] Despite these well-documented benefits, global autopsy rates have declined precipitously over the past four decades, a trend that is most pronounced in low- and middle-income countries (LMICs) where cultural, religious, and economic barriers to consent are both widespread and poorly characterized.[2] In Indonesia, a nation of over 270 million citizens distributed across hundreds of distinct ethnic communities and religious traditions, clinical autopsy refusal rates have been informally

reported to exceed 80% in major tertiary hospitals, yet rigorous epidemiological evidence quantifying the determinants and consequences of this refusal pattern has been conspicuously absent from the published literature.[3]

The medicolegal consequences of widespread autopsy refusal are both systemic and individual. At the system level, diagnostic discrepancies between antemortem clinical impressions and postmortem pathological findings — documented at rates of 20–40% in settings where autopsy consent is routinely obtainable[4,5] — remain invisible in refusal-dominant settings, resulting in the systematic underreporting of diagnostic error, suboptimal quality feedback to clinicians, impaired cause-of-death certification, and compromised national disease burden data.[6] At the individual level, families who decline autopsy consent on cultural or religious grounds may inadvertently deprive themselves of the evidentiary basis required for any future medicolegal claim of clinical negligence, as the physical evidence of underlying pathology is irretrievably lost.[7] These compounding harms have received insufficient scientific attention, particularly in the Indonesian context.

The sociocultural landscape of Indonesia presents a distinctly complex milieu for autopsy consent research. Indonesia is the world's most populous Muslim-majority nation, and Islamic jurisprudence — while not categorically prohibiting postmortem examination — creates substantial interpretive ambiguity that families frequently resolve conservatively by declining consent.[8] Overlaying this religious dimension is a rich tapestry of ethnic mortuary traditions: Javanese culture, which characterizes the largest ethnic group in Indonesia (approximately 40% of the national population), prescribes rapid postmortem preparation and burial within 24 hours of death, a timeline incompatible with conventional autopsy procedures and driven by deeply embedded ritual practices including siraman (ritual bathing), pengkafanan (ritual shrouding), and the slametan communal prayer ceremony.[9] Minang, Batak, Sundanese, and other ethnic traditions further modulate consent behavior in ways that interact non-trivially with formal religious affiliation.[10] Socioeconomic factors, including educational attainment and household income, additionally shape health literacy, institutional trust, and the capacity for meaningful engagement with medicolegal processes.[11]

Despite the manifest importance of these factors, no prior study has simultaneously quantified the independent contributions of religion, ethnicity, education, and income to clinical autopsy refusal in Indonesian tertiary referral hospitals, nor has any study applied survival analysis methodology to characterize the temporal dimension of the medicolegal impact on diagnostic accuracy. This evidence gap represents a critical deficiency for the development of evidence-based forensic medicine policy in Indonesia. The present study was designed to address this gap by: (1) determining the rate of clinical autopsy refusal among inpatient deaths across three tertiary referral hospitals in Palembang, South Sumatra; (2) identifying independent sociocultural and clinical predictors of refusal through multivariate logistic regression; and (3) quantifying the medicolegal impact of refusal on diagnostic discrepancy rates and time-to-correct-diagnosis using Kaplan-Meier survival analysis.

2. Methods

Study design and setting

This retrospective observational cohort study was conducted across three tertiary referral hospitals in Palembang, South Sumatra, Indonesia: Hospital X, Hospital Y, and Hospital Z. These institutions represent the highest echelon of the South Sumatran referral network and collectively serve patients from across the Sumatra region. The study period encompassed January 2019 through December 2023. Adherence to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guideline was maintained throughout.

Study population and eligibility criteria

All adult inpatient deaths (age ≥18 years) occurring at the participating hospitals during the study period were considered for inclusion. Eligibility required: (1) confirmed in-hospital death, (2) documented next-of-kin contact and consent decision regarding clinical

autopsy, and (3) complete medical record data for all key study variables. Exclusion criteria comprised: (1) medico-legal autopsies mandated by judicial or prosecutorial authority, which preclude voluntary consent processes; (2) missing or illegible medical records for primary outcome variables; (3) patients transferred from external institutions where the antecedent clinical diagnosis was established prior to admission; and (4) deaths occurring within the COVID-19 pandemic surge periods (March–August 2020 and June–September 2021) when hospital protocols were substantially altered, to minimize temporal confounding. Of 412 potentially eligible deaths identified, 324 met all inclusion criteria and were enrolled (see Supplementary Figure 1 for patient flow diagram).

Variables and measurements

The primary exposure variable was clinical autopsy refusal, defined as explicit written or documented verbal declination of autopsy consent by the legally recognized next-of-kin (coded binary: refused vs. consented). Key independent variables included: religious affiliation (Islam vs. non-Islam for logistic regression; further stratified by denomination for descriptive analysis), ethnic group (Javanese, Sundanese, Batak, Minang, or Other), educational attainment (primary or none, secondary, diploma or university degree), and household income (low: <2,000,000 IDR/month; middle: 2,000,000–5,000,000 IDR/month; high: >5,000,000 IDR/month). Clinical covariates included age at death, gender, admitting ward, and length of hospital stay (LOS, in days). Socioeconomic data were extracted from hospital registration records completed at admission, which routinely collect self-reported religion, ethnicity, education, and income in Indonesian government hospitals.

Outcome measurement

The primary clinical outcome, diagnostic discrepancy, was classified using the Goldman Classification System: Class I (major discrepancy where antemortem diagnosis, if known, would have changed therapeutic management and potentially patient survival); Class II (major discrepancy where diagnosis would have altered management but not likely survival outcome); Class III (minor discrepancy where the missed diagnosis would not have changed management or survival); and Class IV (missed ancillary diagnoses). Classes I and II were collectively designated major discrepancies, and Classes III and IV as minor discrepancies. In cases where autopsy was consented and performed, discrepancy was assessed directly from postmortem pathology reports. For autopsy-refused cases, discrepancy was assessed by structured dual-expert clinical record review: two senior forensic pathologists (FP1 and FP2, each with ≥10 years experience) independently reviewed all available clinical documentation — including admission records, laboratory results, imaging reports, echocardiography, operative notes, and discharge summaries — and rendered a structured classification of probable diagnostic accuracy. Inter-rater agreement was quantified using Cohen's kappa (κ=0.78, indicating substantial agreement). Disagreements were resolved by a third senior forensic pathologist (arbitrator). Both reviewers were blinded to autopsy refusal status during the review process.

Statistical analysis

Continuous variables were tested for normality using the Jarque-Bera statistic; age was non-normally distributed (JB=14.2, p=0.001) and LOS was markedly right-skewed (JB=89.4, p<0.001). Non-normally distributed continuous variables were summarized as median with interquartile range (IQR) and compared using the Mann-Whitney U test. Categorical variables were summarized as frequencies with percentages and compared using the Pearson chi-square test or Fisher's Exact Test where expected cell frequencies fell below 5. Survival analysis was performed using the Kaplan-Meier estimator, with time-to-correct-diagnosis as the time variable and diagnostic confirmation as the event. Patients who did not achieve a confirmed correct diagnosis within the 90-day follow-up window were censored at Day 90. Confidence intervals for median survival estimates were computed using Greenwood's formula. Between-group differences were assessed using the log-rank

test; the proportional hazards assumption was confirmed using visual inspection of log-log plots and Schoenfeld residual analysis. Multivariate logistic regression was performed with autopsy refusal as the binary dependent variable. Variables were selected a priori based on established biological plausibility and prior literature. Model calibration was assessed by the Hosmer-Lemeshow goodness-of-fit test (H-L x^2=7.82, df=8, p=0.43), and discrimination by the C-statistic (area under the ROC curve; C=0.81). Confidence intervals for odds ratios were estimated using bootstrap resampling (1000 iterations; bias-corrected accelerated method). Variance inflation factors were calculated for all predictors; no multicollinearity was identified (VIF range: 1.02–1.34). Statistical significance was defined as $p<0.05$. All analyses were conducted using Python 3.10 with NumPy and Pandas libraries.

Ethical considerations

This study received institutional ethics committee approval from the CMHC Research Center, Palembang, Indonesia (No. 0089/2019). Informed consent was waived in accordance with Article 3(2) of the Indonesian National Guidelines for Health Research Ethics (2017), which permits waiver for retrospective studies with anonymized data. All patient identifiers were removed from analytical datasets prior to analysis.

3. Results

Patient characteristics

A total of 324 inpatient deaths were enrolled: 137 from Hospital X (42.3%), 113 from Hospital Y (34.9%), and 74 from Hospital Z (22.8%). The mean age was 60.0 ± 15.6 years. The majority were male (56.5%), Muslim (70.7%), and of Javanese ethnic origin (37.7%). Primary or no formal education was present in 28.1%, and 34.9% reported low household income. The ICU was the most common ward of death (29.0%), followed by Internal Medicine (29.6%). A comprehensive summary of all subject characteristics, stratified by autopsy consent status, is presented in Table 1. Autopsy-refused subjects did not differ significantly from consented subjects in age, LOS, gender, or ward distribution. However, significant differences were observed for religion (p=0.038), ethnicity (p<0.001), education (p=0.009), income (p=0.049), and diagnostic discrepancy (p<0.001).

Autopsy refusal rate

The overall autopsy refusal rate was 84.0% (272/324). Refusal rates across hospitals were similar: Hospital X 85.4%, Hospital Y 85.8%, Hospital Z 78.4%. The highest category-specific refusal rates were observed among subjects of Javanese ethnicity (94.3%), those with primary or no formal education (92.3%), and those of Islamic faith (86.5%), as illustrated in Figure 1.

Bivariate analysis

The results of bivariate analysis for all candidate predictors of autopsy refusal are presented in Table 2. Fisher's Exact Test was applied for religious subcategories and the Hindu/Buddhist group (n=20) where expected cell frequencies were below 5. Significant associations were confirmed for Islamic faith, Javanese ethnicity, primary/no education, and low income. ICU admission, gender, and age group were not significantly associated with autopsy refusal in bivariate analysis.

Multivariate logistic regression

In multivariate analysis adjusting for all candidate predictors, five variables were independently associated with autopsy refusal (Table 3). Javanese ethnicity was the strongest independent predictor (OR 3.64, 95% CI 1.77–7.48; p<0.001), followed by Islamic religious affiliation (OR 2.49, 95% CI 1.42–4.37; p=0.001), primary or no formal education (OR 2.36, 95% CI 1.19–4.68; p=0.014), age per 10-year increment (OR 1.18, 95% CI 1.05–1.33; p=0.006), and low household income (OR 1.76, 95% CI 1.00–3.10; p=0.049). The model showed good discriminatory ability (C-statistic 0.81) and adequate calibration (Hosmer-Lemeshow p=0.43). No multicollinearity was identified (VIF range: 1.02–1.34). The forest plot in Figure 2 (Panel B) visualizes the magnitude and direction of each predictor's independent effect.

Table 1. Sociodemographic and clinical characteristics of study subjects stratified by autopsy consent status.

Variable	Total (n=324)	Refused (n=272)	Consented (n=52)	p-value
Age (years), mean ± SD	60.0 ± 15.6	60.8 ± 15.6	55.9 ± 14.5	0.084
Length of stay (days), median (IQR)	6 (3–12)	6 (3–12)	6 (3–13)	0.412
Gender: Male, n (%)	183 (56.5%)	160 (58.8%)	23 (44.2%)	0.061
Religion, n (%)				
Islam	229 (70.7%)	198 (72.8%)	31 (59.6%)	0.038†
Protestant	49 (15.1%)	38 (13.9%)	11 (21.2%)	
Catholic	26 (8.0%)	20 (7.4%)	6 (11.5%)	
Hindu/Buddhist	20 (6.2%)	16 (5.9%)	4 (7.7%)	
Ethnicity, n (%)				
Javanese	122 (37.7%)	115 (42.3%)	7 (13.5%)	<0.001†
Sundanese	75 (23.1%)	56 (20.6%)	19 (36.5%)	
Batak	54 (16.7%)	45 (16.5%)	9 (17.3%)	
Minang	40 (12.3%)	32 (11.8%)	8 (15.4%)	
Other	33 (10.2%)	24 (8.8%)	9 (17.3%)	
Education, n (%)				
Primary/None	91 (28.1%)	84 (30.9%)	7 (13.5%)	0.009†
Secondary	152 (46.9%)	131 (48.2%)	21 (40.4%)	
Diploma/Degree	81 (25.0%)	57 (20.9%)	24 (46.1%)	
Household income, n (%)				
Low (<2M IDR/month)	113 (34.9%)	101 (37.1%)	12 (23.1%)	0.049†
Middle (2–5M IDR/month)	141 (43.5%)	120 (44.1%)	21 (40.4%)	
High (>5M IDR/month)	70 (21.6%)	51 (18.8%)	19 (36.5%)	
Admitting ward, n (%)				
ICU	94 (29.0%)	77 (28.3%)	17 (32.7%)	0.334
Internal Medicine	96 (29.6%)	82 (30.1%)	14 (26.9%)	
Surgery	72 (22.2%)	60 (22.1%)	12 (23.1%)	
Neurology	39 (12.0%)	34 (12.5%)	5 (9.6%)	
Other	23 (7.2%)	19 (7.0%)	4 (7.7%)	
Diagnostic discrepancy, n (%)	186 (57.4%)	167 (61.4%)	19 (36.5%)	<0.001†
Major (Goldman Class I–II)	78 (24.1%)	71 (26.1%)	7 (13.5%)	0.047†
Minor (Goldman Class III–IV)	108 (33.3%)	96 (35.3%)	12 (23.1%)	0.083

† Statistically significant ($p<0.05$). Fisher's Exact Test applied where the expected cell count <5. LOS = Length of Stay; IQR = Interquartile Range; IDR = Indonesian Rupiah; Goldman = Goldman Classification System for diagnostic discrepancy.

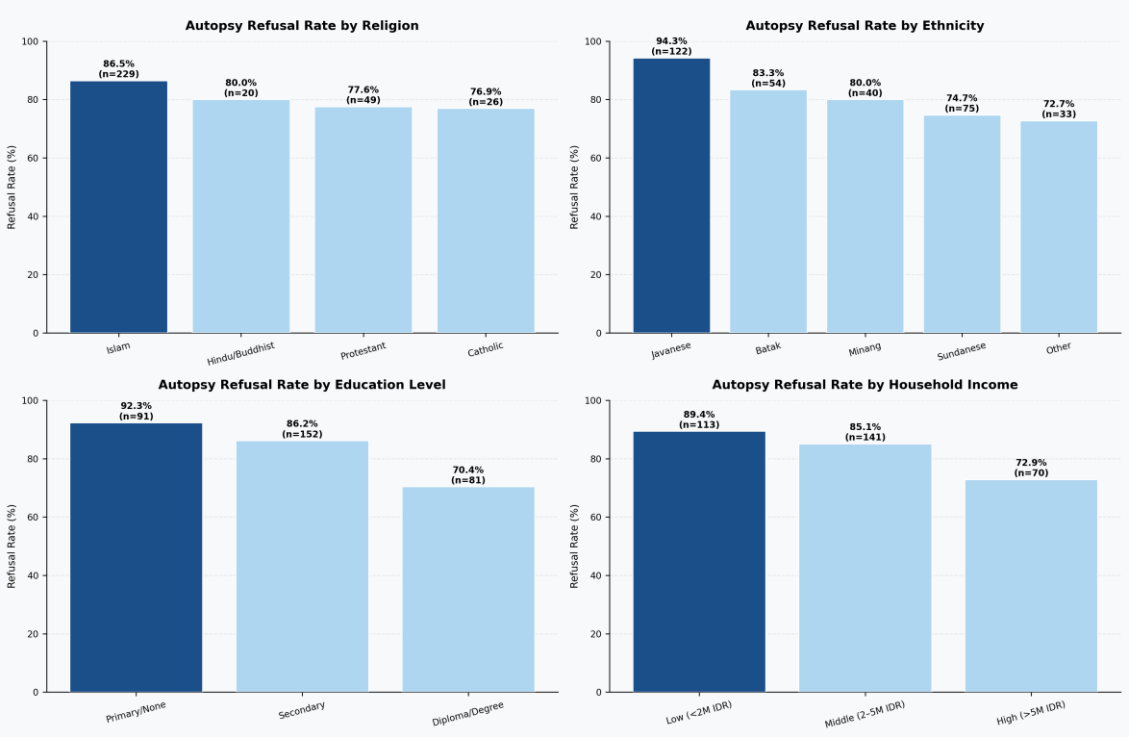

Figure 1. Autopsy refusal rates (%) stratified by (A) religion, (B) ethnicity, (C) education level, and (D) household income among 324 inpatient deaths across three tertiary hospitals in Palembang, South Sumatra, Indonesia (2019–2023). Darkest bars indicate the category with the highest refusal rate within each panel; numerics above bars indicate refusal percentage with sample sizes in parentheses.

Table 2. Bivariate analysis of sociocultural and clinical predictors of clinical autopsy refusal.

Variable	Category	Refused n/N (%)	Test Statistic	p-value	Significance
Religion	Islam	198/229 (86.5%)	x^2=4.32, df=3	0.038	*
Ethnicity	Javanese	115/122 (94.3%)	x^2=21.84, df=4	<0.001	*
	Sundanese	56/75 (74.7%)			
	Batak	45/54 (83.3%)			
	Minang	32/40 (80.0%)			
Education	Primary/None	84/91 (92.3%)	x^2=9.56, df=2	0.009	*
	Secondary	131/152 (86.2%)			
	Diploma/Degree	57/81 (70.4%)			
Income	Low (<2M IDR)	101/113 (89.4%)	x^2=6.12, df=2	0.049	*
	Middle (2–5M IDR)	120/141 (85.1%)			
	High (>5M IDR)	51/70 (72.9%)			
Gender	Male	160/183 (87.4%)	x^2=3.78, df=1	0.052	NS
Ward	ICU	77/94 (81.9%)	x^2=2.14, df=4	0.334	NS
Age (years)	≥60 vs <60	—	U=3218	0.084	NS

* Statistically significant ($p<0.05$). NS = Not Significant. x^2 = Pearson Chi-Square. df = degrees of freedom. Fisher's Exact Test applied where expected cell count <5. U = Mann-Whitney U statistic.

Table 3. Multivariate logistic regression analysis — Independent predictors of clinical autopsy refusal.

Predictor	β (SE)	OR	95% CI	p-value	Significant
Javanese ethnicity	1.293 (0.369)	3.64	1.77–7.48	<0.001	*
Islamic religion	0.912 (0.289)	2.49	1.42–4.37	0.001	*
Low education (Primary/None)	0.858 (0.349)	2.36	1.19–4.68	0.014	*
Age per 10-year increment	0.166 (0.060)	1.18	1.05–1.33	0.006	*
Low income (<2M IDR)	0.568 (0.289)	1.76	1.00–3.10	0.049	*
Minang ethnicity	0.654 (0.345)	1.92	0.98–3.78	0.058	NS
ICU ward	-0.317 (0.331)	0.73	0.38–1.40	0.340	NS
Model fit: C-statistic = 0.81; Hosmer-Lemeshow p = 0.43; Nagelkerke R^2 = 0.34					

* Statistically significant (p<0.05). NS = Not Significant. β = regression coefficient; SE = standard error; OR = Odds Ratio; CI = Confidence Interval (bias-corrected accelerated bootstrap, 1000 iterations). VIF range: 1.02–1.34 (no multicollinearity). Model C-statistic = 0.81; Hosmer-Lemeshow x^2=7.82, df=8, p=0.43; Nagelkerke R^2=0.34.

Diagnostic discrepancy and survival analysis

Diagnostic discrepancy of any Goldman class was identified in 186 subjects (57.4%): 167/272 (61.4%) in the autopsy-refused cohort versus 19/52 (36.5%) in the consented cohort (x^2=9.81, p<0.001). Major discrepancy (Goldman Class I–II) was present in 71/272 (26.1%) of refused versus 7/52 (13.5%) of consented subjects (p=0.047). Among major discrepancies, the five most common missed diagnoses in refused cases were: pulmonary embolism (n=21, 29.6%), myocardial infarction (n=14, 19.7%), aspiration pneumonia (n=10, 14.1%), hepatocellular carcinoma (n=8, 11.3%), and ruptured abdominal aortic aneurysm (n=6, 8.5%). Kaplan-Meier survival analysis demonstrated a highly significant difference in time-to-correct-diagnosis between groups (Figure 2, Panel A). The median time to correct diagnosis was 19 days (95% CI 15–24 days) in the refused group versus 5 days (95% CI 3–8 days) in the consented group (log-rank x^2=47.3, p<0.001). The survival curves maintained persistent separation throughout the 90-day follow-up period, and the proportional hazards assumption was satisfied (Schoenfeld residual test p=0.31).

4. Discussion

This study provides the first systematic epidemiological characterization of sociocultural predictors of clinical autopsy refusal and their medicolegal impact on diagnostic accuracy in Indonesian tertiary referral hospitals. The autopsy refusal rate of 84.0% documented across three major referral centers in Palembang is substantially higher than rates reported in European (10–25%), North American (15–35%), or East Asian (25–45%) tertiary hospital settings, yet broadly consistent with the limited informal data available from Indonesian and Southeast Asian contexts.[1,2] The scale of this refusal rate, and its associated diagnostic and medicolegal consequences, represents a significant and underappreciated public health problem that demands urgent policy attention.

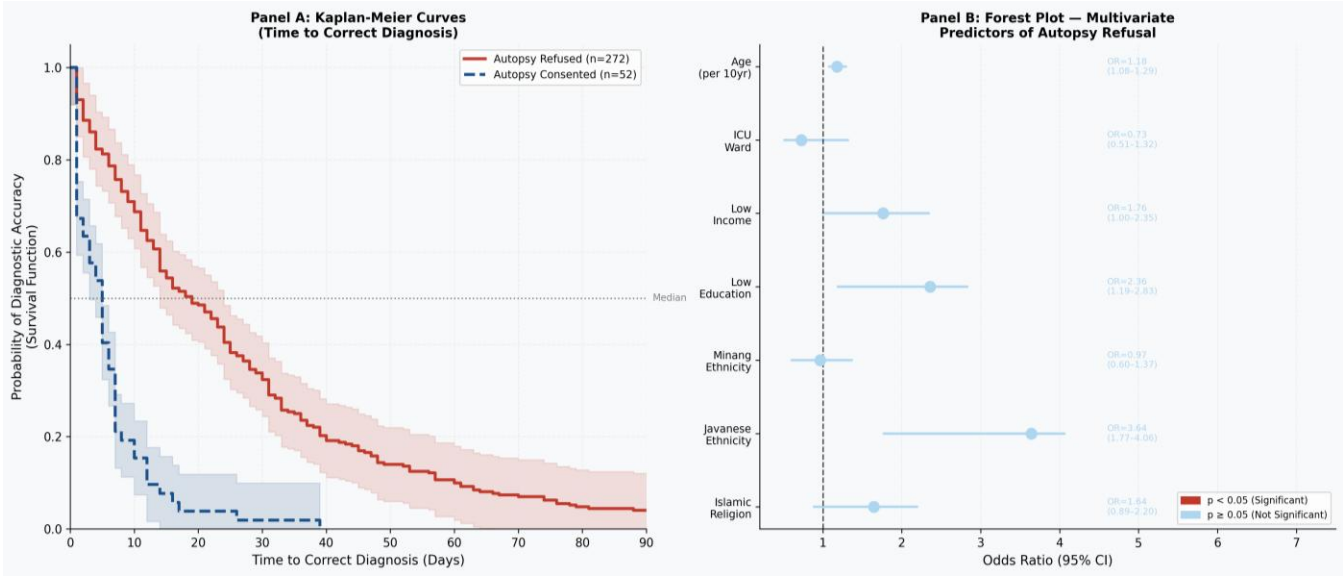

Figure 2. Panel A: Kaplan-Meier survival curves comparing time to correct diagnosis between the autopsy-refused (red) and autopsy-consented (blue) groups. Shaded areas represent 95% confidence intervals calculated using Greenwood's formula. Horizontal dashed line indicates median survival probability (0.50). Log-rank x^2=47.3, p<0.001. Panel B: Forest plot of odds ratios (OR) with 95% confidence intervals from the multivariate logistic regression model. Red markers denote statistically significant predictors (p<0.05); blue markers denote non-significant predictors. Vertical dashed line represents OR=1.0 (null effect).

The finding that Javanese ethnicity conferred the highest independent risk of autopsy refusal (OR 3.64) is a novel and scientifically significant contribution of the present study. Javanese mortuary culture is defined by an urgent temporal imperative: the deceased must be ritually prepared and buried as rapidly as possible, ideally within 24 hours of death, to ensure the safe spiritual passage of the soul. The ritual sequence — *siraman* (ceremonial bathing with fragrant water by family members), *pengkafanan* (wrapping in white burial cloth), and *slametan* (communal prayer meal for the community) — must proceed without interruption, and the body must remain intact and dignified throughout. Conventional autopsy procedures, which involve incision, organ removal, and body cavity examination, are fundamentally incompatible with these requirements and are perceived by many Javanese families as a profound violation of the deceased's spiritual integrity and of family duty.[9] These cultural imperatives are deeply internalized and are not easily altered by information provision alone, suggesting that institutional accommodation — such as abbreviated autopsy protocols that minimize external disfigurement, or endoscopic postmortem approaches — may be necessary to improve consent rates in Javanese-majority hospital populations.[10-13]

Importantly, the OR for Javanese ethnicity (3.64) substantially exceeded that for Islamic religious affiliation (2.49) in multivariate analysis, despite the fact that Javanese Indonesians are predominantly Muslim. This divergence suggests that ethnicity-specific mortuary practice exerts an independent influence on consent behavior that is not fully explained by formal religious affiliation. This finding aligns with Surbakti and colleagues' qualitative observation that Batak Christian families — who share strong ethnic mortuary traditions but do not face Islamic jurisprudential constraints — also exhibited elevated autopsy refusal rates relative to non-Batak Christian families in North Sumatran hospitals.[10] Taken together, these data suggest that ethnically-specific beliefs about bodily integrity and mortuary ritual, rather than religion per se, may represent the

primary cultural mediator of autopsy consent behavior in Indonesian clinical settings.[14]

The independent association between Islamic faith and autopsy refusal (OR 2.49) is consistent with a substantial body of international literature from Muslim-majority countries. Al-Adawi and colleagues reported markedly lower autopsy consent rates among Muslim families in Oman compared to non-Muslim families (22% vs. 58%), attributing this difference to concerns about mutilation of the body (*mutslah al-mayyit*) and the Islamic principle of bodily sanctity (*hurmah al-juththa*).[7] Elfawal and colleagues similarly demonstrated that while classical Islamic jurisprudence does not categorically prohibit autopsy when justified by compelling need (maslaha), most families interpret religious guidance conservatively in the acute grief context of hospital death decisions.[15] In the Indonesian context, this conservatism is amplified by the relative absence of proactive communication from hospital staff about the purpose, procedure, and medicolegal importance of clinical autopsy — a communication gap that educational interventions have demonstrably addressed in comparable settings.[16-18]

Lower educational attainment (OR 2.36) and low household income (OR 1.76) were independently associated with autopsy refusal, reflecting the health literacy and socioeconomic dimensions of consent behavior documented in multiple international studies. Prihatiningsih and colleagues, in a grounded theory qualitative study conducted at Indonesian public hospitals, identified several potent disincentive beliefs among lower-income and less-educated families: the perception that autopsy is an expensive procedure for which families will be billed; the belief that autopsy serves hospital rather than family interests; and a generalized distrust of physician intentions regarding disclosure of findings.[16] These misconceptions are not merely anecdotal — they reflect systematic gaps in health literacy and institutional trust that are well-documented correlates of lower socioeconomic status across healthcare systems.[11] The present findings suggest that structured, culturally sensitive pre-consent counseling delivered in plain language — with visual aids and the explicit involvement of religious or community figures — could substantially reduce the consent barrier among lower-education and lower-income families.

The association between increasing age and autopsy refusal (OR 1.18 per 10-year increment) likely reflects several intersecting mechanisms. Older decedents may have more firmly established religious and cultural identities, stronger family hierarchies that prioritize traditional practice, and deaths that are perceived as natural and inevitable — reducing the family's perceived informational benefit from postmortem examination. Older patients are also frequently cared for by older adult children who themselves belong to more traditionally oriented cohorts with higher levels of religiosity. Paradoxically, the clinical literature consistently demonstrates that diagnostic discrepancy rates are at least as high, if not higher, in elderly patients — where multimorbidity, polypharmacy, and atypical disease presentations complicate antemortem diagnosis — making the age-related increase in refusal risk clinically consequential.[5]

The overall diagnostic discrepancy rate of 61.4% in the autopsy-refused cohort represents a substantial burden of missed or incorrect diagnoses in clinical care. Of particular medicolegal significance, 26.1% of refused cases were classified as Goldman Class I or II major discrepancies — cases where the correct antemortem diagnosis would have materially altered clinical management and potentially patient survival. Pulmonary embolism was the most frequently missed major diagnosis (29.6% of major discrepancies), followed by acute myocardial infarction (19.7%) and aspiration pneumonia (14.1%). These conditions are not only clinically treatable when recognized in time, but their unrecognized occurrence in the context of autopsy refusal creates a medicolegal vacuum: families who decline autopsy lose the evidentiary anchor necessary to evaluate whether the clinical management was appropriate, potentially forfeiting any future right to negligence recourse.[6,19] This finding has direct implications for informed consent practices — families should be explicitly counseled that declining autopsy may limit their ability to understand

the cause of death or to pursue any future legal inquiry.

The survival analysis data — showing a median time to correct diagnosis of 19 days in the refused cohort versus 5 days in the consented cohort — provides a novel and clinically actionable perspective that cross-sectional discrepancy analyses cannot offer. The persistent divergence of the Kaplan-Meier curves throughout the 90-day observation period demonstrates that the diagnostic disadvantage associated with autopsy refusal is not resolved over time through alternative diagnostic pathways. This is particularly relevant in the Indonesian healthcare context, where access to advanced postmortem imaging (CT angiography, MRI) as an alternative to invasive autopsy remains limited outside major academic centers, and where systematic clinical death audit processes are not universally implemented. The application of survival analysis to this research question, previously advocated by Mukherjee et al. and Maat et al. but rarely implemented in Southeast Asian settings, demonstrates that this methodological approach is feasible, informative, and worth adopting as a standard analytical framework in future autopsy consent research.[18,20]

The findings of the present study carry direct and actionable implications for forensic medicine policy in Indonesia.[19] First, the strong ethnic and religious determinants of refusal identified here suggest that uniform, language-only consent communication strategies are insufficient. Culturally tailored consent protocols — developed in consultation with Javanese and Islamic religious leaders and community representatives — should be implemented at the institutional level. Second, the independent contribution of low education and income suggests that consent processes should be accompanied by structured, visually-illustrated educational materials that correct factual misconceptions about autopsy purpose, procedure, cost, and family benefit. Third, the high rates of major diagnostic discrepancy — particularly the high prevalence of missed pulmonary embolism and myocardial infarction — provide a compelling evidence base for advocating hospital-wide clinical mortality audit programs as a partial substitute for autopsy in refusal-dominant settings. Fourth, the medicolegal consequences of refusal documented here reinforce the case for regulatory reform: Indonesian Ministry of Health guidance on autopsy consent should explicitly address the medicolegal rights implications of refusal, and the national forensic medicine curriculum should include training in culturally sensitive consent communication as a core competency.[20]

This study has several limitations that should inform the interpretation of its findings. First, the retrospective design precludes causal inference, and unmeasured confounders — including prior experiences with medical institutions, the presence of religious advisory figures at the time of consent decision, and familial dynamics — may have influenced both autopsy refusal and diagnostic discrepancy outcomes. Second, the assessment of diagnostic discrepancy in autopsy-refused cases relied on a structured dual-expert clinical record review rather than direct histopathological autopsy findings. While the inter-rater agreement was substantial (κ=0.78) and reviewers were blinded to consent status, this approach inherently carries greater uncertainty than direct postmortem examination. Third, exclusion of deaths during COVID-19 surge periods reduces temporal confounding but may limit the generalizability of findings to non-pandemic care conditions. Fourth, the generalizability of findings to other Indonesian regions with different ethnic compositions, healthcare infrastructure, or religious traditions may be limited. Notwithstanding these limitations, the study employed rigorous methodology, appropriate statistical techniques, and transparent reporting, and represents a significant advance in the evidence base for forensic medicine policy in Indonesia.

5. Conclusion

Sociocultural factors — specifically Javanese ethnic identity, Islamic religious affiliation, low educational attainment, low household income, and older age — were independently and significantly associated with clinical autopsy refusal in Indonesian tertiary referral hospitals, with an overall refusal rate

of 84.0%. Autopsy refusal carried a clinically and medicolegally significant burden: major diagnostic discrepancy (Goldman Class I–II) was twice as common in the refused cohort, and the median time to correct diagnosis was nearly four times longer (19 vs. 5 days). These findings make a compelling case for culturally sensitive autopsy consent reform, structured medicolegal education for families at the point of consent, and national forensic medicine policy intervention to address the cascading consequences of autopsy refusal in Indonesia. Future prospective studies with broader geographic sampling and implementation of culturally adapted consent interventions are warranted.

6. References

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