



The Role Of Health Function Expenditure In Achieving Sdg 3 Moderated By Apip And Iepk In Indonesia

Moh Agil ¹⁾; Haryono Pasang Kamase ²⁾; Muhammad Ikbald Abdullah ³⁾; Fikry Karim ⁴⁾

¹⁾*Study Program of Public Sector Accounting Faculty Of Economics and Business, Universitas Tadulako, Indonesia*

^{2,3,4)} *Department of Accounting, Faculty Of Economics and Business, Universitas Tadulako, Indonesia*

Email: ¹⁾ Mohagill119@gmail.com; ²⁾ Haryonokamase@untad.ac.id; ³⁾ ikbalabdullah@untad.ac.id

⁴⁾ fikrykarim@untad.ac.id

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ABSTRACT

Health is a central pillar of sustainable development and a key priority within Sustainable Development Goal 3 (SDG 3), yet Indonesia continues to face persistent health disparities across regions despite increasing public health expenditure. This study examines whether health function expenditure effectively improves SDG 3 outcomes and investigates the moderating roles of internal government supervision and corruption control. Using panel data from Indonesian provincial, district, and municipal governments for the post-pandemic period, this research applies regression and moderation analysis to assess the relationships among health expenditure, SDG 3 achievement, the capacity of the Government Internal Supervisory Apparatus (APIP), and the Effectiveness of Corruption Control Index (IEPK). The findings indicate that health function expenditure positively influences SDG 3 outcomes, and this effect is significantly strengthened when supported by effective internal supervision and strong corruption control. These results highlight that budget size alone is insufficient; governance quality plays a crucial role in translating expenditure into health improvements. The study contributes to the literature by integrating fiscal policy and governance perspectives and provides policy-relevant insights for strengthening accountability mechanisms to accelerate SDG 3 achievement in Indonesia.

INTRODUCTION

Health is a central pillar of sustainable development and a global priority as articulated in the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-Being), which emphasizes every individual's right to access quality health services, the reduction of

maternal and infant mortality, and the prevention of communicable and non-communicable diseases (United Nations, 2023). In Indonesia, despite strong commitments to SDG 3 being reflected in various national policies and programs, health indicators reveal that substantial challenges remain. The 2022 Indonesian Nutritional Status Survey (SSGI) estimated the national stunting prevalence at 21.6%, which remains well above the government's target of reducing it to $\leq 14\%$ by 2024. Data from Statistics Indonesia (BPS) and the Ministry of Health further indicate significant regional disparities, with many provinces outside Java recording stunting rates far above the national average. In addition, maternal mortality ratios in several provinces remain considerably higher than the SDG target, which globally aims to reduce maternal mortality to around 70 per 100,000 live births (BPS, 2023; Ministry of Health, 2023).

Health expenditure constitutes a crucial public policy instrument for accelerating the achievement of Sustainable Development Goal 3, which focuses on improving the quality of health services and overall societal well-being (Torina, Susanti, & Hidayah, 2022). In Indonesia, both central and local governments have increased health budget allocations, particularly following the COVID-19 pandemic, through initiatives ranging from the procurement of personal protective equipment to strengthening health facilities and workforce capacity (Ahyuni & Sutjipto, 2023) & (D. P. Sari & Arifin, 2020). However, increases in budget allocations do not always translate proportionally into improvements in health outcomes, as their effectiveness is strongly influenced by budget management, service accessibility, and local socio-economic conditions (Zubir, Hartono, & Kharis, 2023) & (Rima Ida et al., 2023). During the pandemic, one notable case involved corruption in the procurement of personal protective equipment amounting to Rp3.03 trillion, with estimated state losses of Rp300–625 billion (KPK via Metro TV; CNN Indonesia, 2023). In the post-pandemic period, governance issues have shifted toward corruption in medical equipment procurement at hospitals, misuse of operational funds, and fraud within the National Health Insurance (JKN) system. These include the Rp420 million medical equipment procurement case at RSUD Arifin Achmad Riau involving price mark-ups (Pekanbaru District Attorney, 2023), the stalled construction of an inpatient building at RSUD Bangkinang causing state losses amounting to billions of rupiah (Riau Online/Kompas, 2023), fictitious BPJS claims resulting in estimated national losses of Rp10–20 trillion annually (KPK RI, 2024), and the misuse of Health Operational Assistance (BOK) funds in Central Tapanuli and health centers in East Nusa Tenggara causing losses of up to Rp8 billion (Antara News, 2023). These conditions indicate that, despite increasing budget allocations, the effectiveness of health spending in improving health outcomes remains constrained by inefficiencies, corrupt practices, and weak oversight. Consequently, these issues may slow progress toward achieving SDG 3 in Indonesia, as service quality, accessibility, and the equitable distribution of health resources are undermined. Therefore, further research on the effectiveness of budget allocation, the integrity of fund management, and the role of oversight mechanisms is crucial to ensure that health expenditure can contribute optimally to improving population health outcomes and accelerating the achievement of SDG 3 targets in Indonesia.

The Government Internal Supervisory Apparatus (Aparat Pengawas Intern Pemerintah/APIP) is an internal oversight institution or unit within the government that is responsible for conducting supervision, control, and evaluation of budget implementation and public policies, including those in the health sector, with the objective of ensuring accountability, transparency, and efficiency in the use of public funds. In the context of health expenditure, APIP plays a strategic role in ensuring that allocated budgets are used in accordance with their intended purposes, while minimizing the risks of misuse, inefficiency, and corrupt practices that may hinder improvements in the quality of health services (Malelea & Furqan, 2024) & (Bua & Karim, 2024). Research by (MARJULITA, 2024) indicates that APIP supervision encompasses routine inspections, internal audits, and monitoring of procurement mechanisms for goods and services, the disbursement of health operational assistance funds, as well as claims under the National Health Insurance (Jaminan Kesehatan Nasional/JKN) program. Effective oversight by

APIP enables the optimization of health budget allocations, thereby enhancing health service outputs and outcomes, ensuring public access to primary and referral health services, and accelerating the achievement of national health indicators, including the targets of Sustainable Development Goal 3 (SDG 3). In this regard, APIP serves as a critical instrument in bridging the gap between budget allocation and the attainment of sustainable health targets (Firmansyah, 2025).

The Corruption Control Effectiveness Index (Indeks Efektivitas Pengendalian Korupsi/IEPK) is a metric used to assess the extent to which governments are able to control corrupt practices through effective policies, oversight mechanisms, and law enforcement (Marwiyah et al., 2024). In the context of health sector budgeting, IEPK plays a vital role, as a higher level of corruption control effectiveness ensures that budget allocations are utilized appropriately, reduces the risks of misuse, inefficiency, and fraudulent practices such as mark-ups in medical equipment procurement, misappropriation of operational funds at community health centers (Puskesmas), or fictitious claims within the JKN program. Strong IEPK performance enhances internal oversight and accountability mechanisms, thereby improving health service outputs and outcomes, ensuring more equitable access to health facilities, and optimizing the achievement of national health indicators and SDG 3 targets. Consequently, IEPK functions as an essential instrument in ensuring that health expenditures translate into tangible improvements in population health outcomes and accelerate progress toward SDG 3 in Indonesia (Aprilia et al., 2024) & (Indriyani, et al., 2024).

Fiscal governance and internal oversight are therefore critical elements that cannot be overlooked. Both international and national literature emphasize that the effectiveness of public financial management, transparency, and internal auditing are key variables that strengthen or moderate the impact of public spending on development outcomes. Nevertheless, in the Indonesian context, only a limited number of studies have explicitly examined how moderating variables such as APIP capacity and the Corruption Control Effectiveness Index (IEPK) influence the relationship between health expenditure and the achievement of SDG 3 indicators. Studies in the nutrition and health literature, particularly those addressing stunting, suggest that the core challenges lie not only in budget availability but also in program implementation, resource distribution, and the quality of local-level oversight. For instance, (Rima Ida et al., 2023). provide evidence that local contextual factors such as sanitation and caregiving practices significantly affect stunting prevalence despite the availability of nutrition programs. Similarly, research on the digitalization of child health data recording in efforts toward zero stunting cases indicates that national stunting prevalence remains relatively high (approximately 21.5%), with certain provinces exhibiting slower progress in improving health indicators (Prasetyo & Wahyu, 2025).

Despite these findings, the literature integrating moderating variables such as APIP and IEPK within the framework of health function expenditure and SDG 3 outcomes in Indonesia remains limited. Most prior studies have focused primarily on the relationship between budget allocation and health indicators without explicitly incorporating internal oversight or corruption control effectiveness, thereby paying insufficient attention to accountability and the effectiveness of budget management. Previous studies, such as those examining maternal mortality in Grobogan Regency, have identified systemic factors but have not assessed the role of internal audits or corruption control effectiveness as moderating variables. This condition highlights a significant research gap in testing a comprehensive model in which health expenditure serves as the independent variable influencing SDG 3 outcomes, moderated by internal supervisory capacity (APIP) and corruption control effectiveness (IEPK), using national or cross provincial data for the post-pandemic period of 2021–2022.

Accordingly, this study aims to analyze the impact of health function expenditure on the achievement of SDG 3 indicators such as stunting prevalence, maternal and infant mortality rates, and life expectancy while simultaneously examining the moderating roles of APIP and IEPK in strengthening or weakening this relationship. The findings are expected to provide an

empirical foundation for formulating health budget management policies that are more accountable, efficient, and oriented toward accelerating the achievement of SDG 3 in Indonesia. This study focuses on 503 provincial, regency, and municipal governments in Indonesia during the 2021–2022 period, employing panel data that allow for the analysis of temporal dynamics and regional variations. Its contribution lies in providing stronger empirical evidence on how health budgets can be made more effective when accompanied by robust internal oversight and effective corruption control, thereby offering valuable policy insights for improving budget allocation, transparency, and financial management to accelerate progress toward SDG 3 in Indonesia.

LITERATURE REVIEW

Good Governance Theory

Good governance plays a crucial role in achieving Sustainable Development Goal (SDG) 3, namely good health and well-being, through the effective management of public expenditure in the health sector. In the Indonesian context, the implementation of good governance principles—such as transparency, accountability, and public participation in budget planning—is key to ensuring that health sector funding allocations align with community needs and development priorities. Research by (Pramesti & Kusumawati, 2021) reveals that the application of these principles can enhance the effectiveness of health budget utilization, while Dwitasari and (Dwitasari & Mulyana, 2025), emphasize the importance of community participation in budgetary decision-making to ensure policy sustainability. Furthermore, the moderating role of the Government Internal Supervisory Apparatus (APIP) and the implementation of Performance Evaluation and Supervision (IEPK) are strategic in overseeing the use of health expenditure, thereby preventing the misuse of public funds and ensuring the achievement of health objectives. Synergy between central and local governments, supported by rigorous oversight by APIP, is a determining factor in the successful attainment of SDG 3, as it ensures that health budgets are used efficiently, transparently, and with a positive impact on society.

Sustainable Development Theory

Sustainable Development Theory emerged in the 1980s, focusing on coordinated development that integrates economic, social, and environmental dimensions. Since then, Sustainable Development Theory has become a central component of governmental and business agendas. For economically developed countries, sustainable development has the potential to foster new patterns of international relations based on shared interests and humanitarian values (Clément et al., 2022). Meanwhile, sustainable development provides at least a general framework for developing countries and seeks to accelerate their development process (Shi et al., 2019).

Public expenditure on the health function in achieving SDG 3 is highly relevant to the Sustainable Development Goals (SDGs) framework, particularly those related to health and well-being. SDG 3 aims to ensure healthy lives and promote well-being for all at all ages. In this context, health sector expenditure plays a key role in providing adequate resources to improve access to and the quality of healthcare services. The moderating roles of the Government Internal Supervisory Apparatus (APIP) and the Financial Management Evaluation Index (IEPK) serve as oversight mechanisms to ensure that budget utilization is effective, efficient, and compliant with established standards. With effective supervision, health budgets can be optimally utilized to reduce disparities in healthcare services and contribute to the achievement of SDG 3 targets, namely improving overall quality of life.

Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs), known in Indonesian as *Tujuan Pembangunan Berkelanjutan*, consist of 17 global goals with 169 targets established by the United Nations within a defined timeframe as a global agenda to ensure peace, prosperity, and human well-being, both for the present and the future. The SDGs serve as a continuation of the Millennium Development Goals (MDGs), which concluded in 2015, and represent a new milestone in global development, as the SDGs framework incorporates a set of universal development objectives intended for the 2015–2030 period. In Indonesia, the implementation of the SDGs is formally regulated through Presidential Regulation (Peraturan Presiden) Number 59 of 2017 concerning the Implementation of Sustainable Development Goals Achievement.

Health Function Expenditure in Achieving SDG 3

Research related to the achievement of SDG 3 (Good Health and Well-being) highlights the importance of efficiency in the management of health sector budgets. Studies by (Nafiah, 2020) and (Risdiyanto, Mollet, & Hutajulu, 2023) on the effectiveness of mandatory health spending in Papua reveal that health expenditure and general allocation funds have a significant effect on public health outcomes, while special autonomy funds do not show a significant impact. (Setiawan et al., 2025), examined the effects of per capita expenditure and health spending on morbidity rates in Java Island and found that per capita expenditure has a negative and significant effect on morbidity rates, whereas health spending does not have a significant effect. Furthermore, findings by (Rahmawati & Muhsyaf, 2025) as well as (Purnomoratih & Ramadhani, 2023), using Data Envelopment Analysis (DEA) to assess the efficiency of budget expenditures in the health and education sectors, indicate that several provinces, such as Riau and the Riau Islands, achieved high efficiency levels, while other provinces, including the Special Region of Yogyakarta and East Kalimantan, experienced inefficiencies. These findings emphasize that efficient and well-targeted budget management in the health sector is crucial for improving the quality of life of the population and supporting the achievement of SDG 3.

Based on previous studies, this research formulates the following hypothesis:

H1: Health function expenditure has a positive effect on improving health outcomes in Indonesia (SDG 3).

Health Function Expenditure In Achieving SDG 3 Moderated By APIP

Oversight of health function expenditure by the Government Internal Supervisory Apparatus (Aparat Pengawasan Intern Pemerintah APIP) in Indonesia plays a crucial role in supporting the achievement of SDG 3, namely good health and well-being. APIP is responsible for ensuring that health budgets are managed efficiently, effectively, and accountably through various supervisory activities, including financial audits, performance evaluations, and corrective actions against identified irregularities (Sorooshian, 2024). As explained by (Priono et al., 2025), internal supervision conducted by APIP at the regional government level focuses on the management of health budgets and the prevention of misuse of public funds. In emergency situations such as the COVID-19 pandemic, (Selan et al., 2024) emphasize the urgency of stricter oversight, particularly in the procurement of health-related goods and services that are highly vulnerable to corruption. Through effective supervision, APIP can ensure that health budgets are utilized to improve health infrastructure and service delivery, thereby contributing to the achievement of national health objectives and the overall realization of SDG 3.

Based on previous studies, this research proposes the following hypothesis:

H2: The role of the Government Internal Supervisory Apparatus (APIP) in overseeing health function expenditure has a positive effect on improving health outcomes in Indonesia (SDG 3).

Health Function Expenditure in Achieving SDG 3 Moderated by IEPK in Indonesia

The Corruption Control Effectiveness Index (Indeks Efektivitas Pengendalian Korupsi IEPK) is an important measurement tool for assessing the extent to which oversight and budget management mechanisms function effectively in reducing corruption risks, particularly in the health sector budget. In the Indonesian context, the health sector, which receives substantial budget allocations, is highly vulnerable to potential misuse of public funds. As discussed in the study by (Mengko, 2024), strengthening leadership with anti-corruption integrity in the health sector is a key factor in ensuring that large-scale budgets, such as those recorded in the State Budget (APBN), are not misappropriated (Kamase et al., 2024). In this regard, the role of APIP and the strengthening of internal control systems are essential to mitigating corruption risks in the management of health expenditures.

Furthermore, research by (Oktarina & Irawan, 2024) reveals that corruption in the management of health budgets during the COVID-19 pandemic particularly in procurement programs for goods and services was highly likely to occur in the absence of strict oversight. Corruption cases related to COVID-19 budgets demonstrate that corruption risks tend to increase alongside rapid budgetary changes, such as budget reallocations and refocusing of activities, which may be implemented without adequate control mechanisms. Therefore, IEPK serves as an instrument to measure the effectiveness of internal controls and budget oversight in preventing corrupt practices, while simultaneously promoting transparency and accountability in the implementation of health function expenditures aimed at achieving sustainable and improved health outcomes in Indonesia.

Based on prior studies, this research proposes the following hypothesis:

H3: The Corruption Control Effectiveness Index (IEPK) positively moderates the relationship between health function expenditure and improvements in health outcomes in Indonesia (SDG 3).

METHODS

Data

The methods This study employs a quantitative approach using Generalized Least Squares (GLS) regression and a panel data model, with statistical analysis conducted using Stata 17. Generalized Least Squares (GLS) is an estimation method in regression analysis developed to address the limitations of the Ordinary Least Squares (OLS) method when classical assumptions particularly homoskedasticity and the absence of autocorrelation in the error term are violated (Wooldridge, 2002). A normality test was not conducted, as the assumption of normally distributed residuals is more relevant for parametric statistical inference in small samples, whereas for obtaining unbiased and efficient coefficient estimates, normality is not required (Knief & Forstmeier, 2021). The data collection process for determining the research sample was carried out using a purposive sampling technique. The dataset consists of all local governments in Indonesia, totaling 548 provinces/regencies/cities over the period 2021–2022. However, six regencies/cities in the Special Capital Region of Jakarta (DKI Jakarta), which are part of the reporting entity of the DKI Jakarta Province, were excluded from the sample. In addition, 78 observations were removed from the research model due to data unavailability. Consequently, the final sample comprised 503 local governments per year of observation, representing approximately 87.83% of the total provinces/regencies/cities in Indonesia. Given that the study covers two fiscal years, the total final sample amounted to 1,006 observations. All data used in this study were obtained from Indonesian government institutions, namely the National Development Planning Agency (Bappenas) for SDG 3 data (percentage of health status in Indonesia by gender and age group), the Ministry of Finance for health

function expenditure data, and the Financial and Development Supervisory Agency (BPKP) for the Corruption Control Effectiveness Index data.

Empirical Model and Variable Operationalization

To address the research problems and simultaneously test the proposed hypotheses, the empirical model employed in this study is formulated as follows:

$$\text{SDGSAI}_{it} = \beta_0 + \beta_1 \text{Apendikit} + \beta_2 \text{Angkesit} + \beta_3 \text{Apip} + \beta_4 \text{Iepk} + \text{eit} \dots (1)$$

SDG3SAI_{it} is a variable representing the achievement of the Sustainable Development Goals (SDGs), measured using the percentage of the population's health status by gender and age group, scaled from 1 to 100. A higher or increasing percentage indicates a greater proportion of the population achieving the national health standard. Accordingly, a higher percentage of population health status by gender and age group reflects a higher level of attainment of SDG 3.

Angkes_{it} represents the health function expenditure variable of provincial, regency, and municipal governments in Indonesia. This variable is measured using total health function expenditure transformed into its natural logarithm (LN). A higher LN value of total health function expenditure indicates better performance in improving public welfare, whereas a lower LN value reflects poorer performance.

APIP_{it} denotes the capability of the Government Internal Supervisory Apparatus (Aparat Pengawas Intern Pemerintah/APIP). According to BPKP (2015), APIP capability is classified into five levels measured on a scale of 1–5. Level 1 (Initial) is characterized by the absence of standardized supervisory practices and reliance on individual performance, resulting in weak governance assurance and ineffective corruption prevention.

Level 2 (Infrastructure) is marked by regular audit implementation that partially meets standards, provides reasonable assurance, complies with regulations, and is capable of detecting corruption. Level 3 (Integrated) indicates that internal audit practices are standardized and aligned with professional standards, capable of providing governance, risk management, and internal control consulting, as well as assessing efficiency, effectiveness, and economy.

Level 4 (Managed) reflects the integration of information across the organization to enhance governance and risk management and to provide comprehensive assurance over governance, risk management, and internal control. Level 5 (Optimizing) represents an internal audit unit that continuously learns, pursues ongoing improvement, and acts as a change agent within the organization.

IEPK_{it} is the Corruption Control (CC) variable measured using the Corruption Control Effectiveness Index (CCEI) and functions as an independent variable reflecting the effectiveness of anti-corruption efforts at the local government level. This index assesses the extent to which oversight mechanisms and law enforcement systems succeed in suppressing corrupt behavior, minimizing budget misallocation, and improving the efficiency of public fund management, particularly in the provision of basic services.

The index is measured on a scale of 1 to 5: 1 (Poor), where corruption risks are ignored and corrupt practices are considered normal; 2 (Learning), where initial structures exist but efforts are limited and inconsistent; 3 (Implementing), where corruption risks are managed through established prevention, detection, and response procedures; 4 (Transforming), where controls are implemented consistently, fostering high ethical and integrity standards; and 5 (Clean), where corruption risks are effectively managed, a strong anti-corruption culture is established, and tangible improvements are evident in bureaucracy and public service delivery.

Table 1 Operational Variable

Name	Variable Operational	Data Source
SDG3	This variable represents the achievement of Sustainable Development Goal 3 (SDG 3) and is measured using the percentage of population health attainment in Indonesia. A higher percentage indicates a better level of health achievement and reflects a higher level of SDG 3 attainment.	The Ministry of National Development Planning/National Development Planning Agency (Bappenas) of the Republic of Indonesia. https://bappenas.go.id/tags-berita/192
Angkesit	The health function expenditure variable is measured using total local government health function spending that has been transformed using the natural logarithm (LN). A higher LN value of total health function expenditure indicates better performance in poverty alleviation, while a lower LN value reflects poorer performance in poverty alleviation.	The Ministry of Finance of the Republic of Indonesia. https://djpk.kemenkeu.go.id/?cat=288
Health Budgeting Expenditure	The APIP capability variable is measured using capability levels on a scale of 1–5: 1) Initial (the absence of standardized supervision practices), 2) Infrastructure (regular audits providing reasonable assurance), 3) Integrated (uniform internal audit practices in accordance with standards), 4) Managed (information integration to enhance governance), and 5) Optimizing (continuous improvement).	The Financial and Development Supervisory Agency (BPKP) of the Republic of Indonesia. https://www.bpkp.go.id
Corruption Control (IEPK)	The Corruption Control variable is measured using the Corruption Control Effectiveness Index (CCEI).	The Financial and Development Supervisory Agency (BPKP) of the Republic of Indonesia. https://www.bpkp.go.id/informan_public/laporankeuangankinerja/kinerja/6

Name	Variable Operational	Data Source
	This index reflects the effectiveness of anti-corruption efforts at the local government level by measuring the success in suppressing corrupt behavior and improving the management of public funds in basic service sectors.	

Source: Processed by the Author (2026)

RESULTS

A complete statistical description of the variables in this study can be seen in Table 2 below:

Table 2 Statistic Descriptive

Variable	Obs	Mean	Std. dev	Min	Max
Sdg3	1.006	69.778	3.345	55.37	77.96
Angbelfung	1.006	28.090	0.648	26.98	31.97
AnFgbelfungXapip	1.006	2.444	0.603	1	3
AngbelfungXiepk	1.006	1.772	0.489	1	3

Source: Compiled by the Author, used stata 17 software (2026)

Table 2 presents the descriptive statistics for several variables used in this study. The variable SDG3 comprises 1,006 observations, with a mean value of 69.778 and a standard deviation of 3.345. The minimum value of this variable is 55.37, while the maximum value reaches 77.96. These figures indicate that most observations are clustered around the mean, with a moderate degree of dispersion.

For the variable Health Function Expenditure (Angbelfung), the mean value is 28.090 with a standard deviation of 0.603, indicating a relatively narrow dispersion compared to the SDG3 variable. The minimum value of Angbelfung is 26.98, while the maximum value is 31.97, suggesting relatively small variation around the mean. The interaction variables Health Function Expenditure × APIP and Health Function Expenditure × IEPK have mean values of 2.444 and 1.772, respectively, with relatively higher standard deviations of 0.603 and 0.489. This indicates that these interaction variables, which capture the interaction between health function expenditure and governance-related factors, exhibit greater variability across observations. The results of the correlation analysis among the variables are presented in the following table:

Table 3 Correlation

	Sdg3	Angbelfung	apip	bpkpiepk
Sdg3	1.000			
Angbelfung	0.330	1.000		
	0.000			
apip	0.306	0.213	1.000	
	0.000	0.000		
iepk	0.208	0.197	0.319	1.000
	0.000	0.000	0.000	

Source: Compiled by the Author, used stata 17 software (2026)

Table 3 presents the results of the correlation analysis among the variables examined in this study. The results indicate that SDG 3 is positively and significantly correlated with Health Function Expenditure (Angbelfung), with a correlation coefficient of 0.330 and a significance level of 0.000. This finding suggests that higher allocations of health function expenditure are associated with improved achievement of SDG 3. In addition, SDG 3 also shows a positive and significant correlation with APIP, with a coefficient of 0.306 ($p = 0.000$), indicating that stronger internal government oversight is associated with better health development outcomes. Meanwhile, the correlation between SDG 3 and IEPK is 0.208 with a significance level of 0.000, reflecting a positive relationship with a relatively weaker but still statistically significant strength. On the other hand, Health Function Expenditure is positively and significantly correlated with APIP ($r = 0.213$, $p = 0.000$) and with IEPK ($r = 0.197$, $p = 0.000$), suggesting that higher levels of health expenditure are associated with more effective internal supervision and corruption control mechanisms. Furthermore, the correlation between APIP and IEPK is 0.319 with a significance level of 0.000, indicating a positive and statistically significant relationship between these two governance dimensions. Overall, all variables presented in Table 3 exhibit statistically significant relationships, with correlation strengths ranging from low to moderate.

Table 4 Multicollinearity

Variable	VIF	1/VIF
angbelfunXApip	2.43	0.411
APIP	2.41	0.415
AngbelfungXlepk	2.13	0.468
IEPK	2.13	0.470
Angbelfung	1.01	0.987
Mean VIF	2.02	

Source: Compiled by the Author, used stata 17 software (2026)

Table 4 shows that all variables in the model have relatively low VIF values, ranging from 1.01 to 2.43, with a mean VIF of 2.02. The interaction variable $\text{angbelfung} \times \text{APIP}$ has the highest VIF value at 2.43, followed by the APIP variable with a VIF of 2.41, while the interaction variable $\text{angbelfung} \times \text{IEPK}$ and IEPK each have a VIF value of 2.13. Meanwhile, the main variable health function expenditure (Angbelfung) has the lowest VIF value of 1.01, indicating almost no linear correlation with the other independent variables. All VIF values are well below the commonly accepted threshold of 10 (and even below the more conservative threshold of 5), thus it can be concluded that there is no serious multicollinearity problem in the regression model, and all independent variables, including the interaction terms, are appropriate for further analysis without causing bias in the estimation of regression coefficients.

Table 5 Hypothesis Testing Result

Sdg 3	Coefficient	Std. err	Z	P>[z]	[95% Conf	Interval]
Cons	30.936	1,054	29.35	0.000	28.87	33.00
Angbelfung	1.380	0.374	36.83	0.000	1.307	1,454
APIP	1.877	0.041	28.89	0.000	1.106	1.268
IEPK	0.502	0.047	10.51	0.000	0.408	0.595

Source: Compiled by the Author, used stata 17 software (2026)

Table 5 presents the results of hypothesis testing using regression analysis with SDG 3 as the dependent variable. The estimation results indicate that the constant (Cons) has a coefficient of 30.936 with a standard error of 1.054, yielding a Z-value of 29.35 and a p-

value of 0.000. This finding indicates that the intercept in the regression model is statistically significant at the 1% significance level. The 95% confidence interval for the constant ranges from 28.87 to 33.00, suggesting that the parameter estimate is relatively stable.

Furthermore, the health function expenditure variable has a regression coefficient of 1.38 with a standard error of 0.374, resulting in a Z-value of 36.83 and a p-value of 0.000. This result indicates that health function expenditure has a positive and statistically significant effect on the achievement of SDG 3 at the 1% significance level. The 95% confidence interval for this coefficient ranges from 1.307 to 1.454, further strengthening the empirical evidence that increases in health function expenditure consistently contribute to improvements in sustainable development outcomes in the health sector.

Furthermore, the APIP variable shows a regression coefficient of 1.877 with a standard error of 0.041, resulting in a Z-value of 28.89 and a p-value of 0.000. These results indicate that APIP has a positive and statistically significant effect on the achievement of SDG 3 at the 1% significance level. This implies that stronger internal government supervisory performance is associated with better progress in health-related sustainable development outcomes. The 95% confidence interval for the APIP coefficient ranges from 1.106 to 1.268, indicating that the estimated parameter is statistically reliable and consistently positive within the specified confidence level.

In addition, the IEPK variable has a regression coefficient of 0.502 with a standard error of 0.047, producing a Z-value of 10.51 and a p-value of 0.000. This finding demonstrates that IEPK also has a positive and statistically significant influence on SDG 3 at the 1% significance level. The positive coefficient suggests that improvements in IEPK are associated with higher levels of achievement in health-related sustainable development indicators. The 95% confidence interval, ranging from 0.408 to 0.595, confirms the robustness and stability of the estimated effect, reinforcing the conclusion that IEPK plays a meaningful role in supporting the attainment of SDG 3.

Table 6 Moderated Testing

Sdg 3	Coefficient	Std. err	Z	P>[z]	[95% Conf	Interval]
Cons	29.579	1.046	28.26	0.000	27.528	31.631
AngbelfungXapip	0.118	0.455	2.60	0.009	0.029	0.207
AngbelfungXiepk	0.119	0.549	2.18	0.029	0.012	0.227

Source: Compiled by the Author, used stata 17 software (2026)

Table 6 presents the results of the moderated regression analysis with SDG 3 as the dependent variable. The estimation results show that the constant coefficient is 29.579 with a standard error of 1.046, yielding a Z-value of 28.26 and a p-value of 0.000, indicating that the intercept is statistically significant at the 1% significance level. The 95% confidence interval for the constant ranges from 27.528 to 31.631, suggesting that the estimated intercept is stable and reliable as a baseline representation of the relationship among variables in the model.

Furthermore, the interaction variable between health function expenditure and APIP has a coefficient of 0.118 with a standard error of 0.455, resulting in a Z-value of 2.60 and a p-value of 0.009. This finding indicates that the interaction between health function expenditure and APIP has a positive and statistically significant effect on the achievement of SDG 3. The 95% confidence interval for this coefficient ranges from 0.029 to 0.207, confirming the role of APIP as a moderating variable.

In addition, the interaction variable between health function expenditure and IEPK has a coefficient of 0.119 with a standard error of 0.549, producing a Z-value of 2.18 and a p-value of 0.029. This result demonstrates that the effectiveness of corruption control also acts as a

moderating variable with a positive and statistically significant influence on the relationship between health function expenditure and the achievement of SDG 3. The 95% confidence interval for this coefficient ranges from 0.012 to 0.227, further reinforcing the moderating role of IEPK.

DISCUSSION

Health function expenditure has been proven to play an important role in improving the achievement of Sustainable Development Goal 3 (SDG 3), as reflected by a positive coefficient of 1.38 with a 1% level of significance ($p\text{-value} = 0.000$). This coefficient indicates that every increase in health function spending is significantly followed by an improvement in health outcome indicators, suggesting that health expenditure serves as an effective policy instrument for enhancing public health status. These findings imply that adequate budget allocation enables local governments to expand access to health services, improve the quality of health facilities and medical personnel, and strengthen health programs oriented toward prevention and the improvement of overall well-being.

Furthermore, the role of governance becomes increasingly evident when health function expenditure is accompanied by effective internal supervision and corruption control. This is reflected in the interaction coefficients between health expenditure and APIP of 0.118 and between health expenditure and IEPK of 0.119, both of which are significant at the 1% level. These coefficients indicate that the presence of APIP and higher effectiveness of corruption control strengthen the impact of health expenditure on the achievement of SDG 3. With well-functioning internal supervision and controlled corruption risks, health budgets can be managed more accountably and targeted more accurately, thereby optimizing their impact on improving public health outcomes.

From a theoretical perspective, these results are consistent with Good Governance Theory, which emphasizes the importance of transparency, accountability, and supervision in public financial management. Within this theoretical framework, public budgets including health function expenditure will generate maximum welfare impacts when managed efficiently and subject to adequate oversight. The presence of APIP as an internal supervisory body strengthens control mechanisms, ensuring that budgets are used in accordance with their objectives and minimizing inefficiencies and deviations. In addition, these findings are also aligned with Sustainable Development Theory, which views the achievement of sustainable development goals as dependent not only on the availability of resources but also on institutional capacity and governance quality that support the sustainability of development outcomes. Thus, APIP and IEPK function as institutional instruments that ensure health budgets genuinely contribute to the achievement of SDG 3.

Empirically, the results of this study reinforce previous findings that health expenditure has a positive relationship with health indicators, while its impact is highly dependent on the effectiveness of management and supervision. Studies by (Nafiah, 2020) and (Sari, 2023) show that health spending contributes to improvements in health status and reductions in stunting prevalence, although the magnitude of the effects varies across regions. Rahmawati and Muhsyaf (2025) also emphasize that expenditure efficiency is a key determinant of the success of health spending. Moreover, the findings on the moderating roles of APIP and IEPK are consistent with studies by (Mengko, 2024) and (Priono et al., 2025), which highlight the importance of internal supervision and corruption control in ensuring that public budgets translate into tangible development outcomes. Therefore, this study provides additional empirical evidence that the achievement of SDG 3 in Indonesia is determined not only by the size of health expenditure but also by the quality of internal supervision and the effectiveness of corruption control accompanying it.

Overall, this discussion underscores that the achievement of SDG 3 depends not solely on the magnitude of health function expenditure but is also strongly influenced by the quality of governance. Synergy between adequate health budget allocation, effective internal supervision through APIP, and high effectiveness of corruption control creates a conducive environment for public financial management. In this context, policies aimed at increasing health expenditure need to be accompanied by systematic efforts to strengthen corruption control and supervisory functions, so that every allocated budget can generate maximum impact on the sustainable achievement of health development goals.

CONCLUSION

This study demonstrates that health function expenditure has a positive and significant effect on the achievement of Sustainable Development Goal 3 (SDG 3) in Indonesia. Increasing allocations for health spending can encourage improvements in public health indicators when managed effectively. Furthermore, the findings indicate that the capability of the Government Internal Supervisory Apparatus (Aparat Pengawas Intern Pemerintah/APIP) and the effectiveness of corruption control, as measured by the Corruption Control Effectiveness Index (Indeks Efektivitas Pengendalian Korupsi/IEPK), strengthen the impact of health expenditure on SDG 3 achievement. These results emphasize that the size of the budget alone is not sufficient; it must be supported by good governance, strong internal supervision, and effective corruption control so that health spending can generate optimal outcomes. Future research is recommended to employ a longer observation period and more specific SDG 3 indicators, such as stunting and maternal and infant mortality rates. In addition, the inclusion of socio-economic control variables is expected to provide more comprehensive analytical results. From a practical perspective, these findings imply that policies aimed at increasing health function expenditure should be accompanied by strengthening the role of APIP and corruption control systems. Both central and local governments are expected to focus not only on the amount of budget allocation but also on improving governance quality and accountability to accelerate the sustainable achievement of SDG 3 in Indonesia.

LIMITATION

This study has limitations related to the relatively short observation period, which only covers the years 2021–2022. In addition, the SDG 3 indicators used are still aggregate in nature and therefore do not fully capture variations across individual health indicators. This study also does not include other socio-economic variables that may potentially influence health outcomes.

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