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Cryptocurrencies and Financial Markets: Assessing Volatility, Risk, and Regulation

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ABSTRACT

The potential of cryptocurrencies, specifically Bitcoin and Ethereum, in financing neonatal care, focusing on their volatility, perceived risks, and regulatory implications, is studied. The research combines historical data on cryptocurrency market performance and survey results from healthcare professionals involved in neonatal care finance. Key findings reveal that Bitcoin exhibits higher volatility (6.73%) than Ethereum (6.27%), making it a less stable option for healthcare financing. Survey results show that 60% of respondents consider high volatility a significant barrier, while 25% are concerned about regulatory uncertainty. Despite these challenges, 15% of respondents view cryptocurrencies as a potential stable funding source. The study emphasizes the need for clear regulatory frameworks and the potential of stablecoins or hedging strategies to mitigate risks. The findings suggest that while cryptocurrencies could offer innovative solutions for funding neonatal care, volatility and regulatory concerns must be addressed to ensure their viability in healthcare systems. Future research should explore alternative cryptocurrencies, such as stablecoins, and track long-term regulatory changes in healthcare financing.

Keywords: *Cryptocurrencies, Volatility, Risk Perception, Neonatal Care, Regulation.*

1. INTRODUCTION

Healthcare has been one of the sectors that cryptocurrencies have the potential to revolutionize [1]. The usage of digital currencies like Bitcoin or Ethereum requires decentralized blockchain technology that provides transparency, efficiency, and low-cost transactions [2]. However, as a whole, cryptocurrencies present many challenges as a whole, mainly due to their volatility and the unclear regulatory framework surrounding them. This has led to their adoption in critical areas such as healthcare, especially neonatal care, with enthusiasm and caution. The neonatal care, a highly resource-intensive, specialized sector, is often financially challenged and could be relieved by innovative funding mechanisms like cryptocurrencies [3].

Financial constraints are very prevalent in healthcare, particularly in neonatal care. Hospitals' neonatal care units have limited budgets, fluctuating funding sources, and increasing medical costs [4]. Finances allocated to neonatal care are often insufficient in many countries for supporting the increasing need for more sophisticated equipment and treatments [5]. Poor infrastructure, inadequate staffing, and compromised care quality are often the result of a shortage of funds. In this regard, integration of cryptocurrencies may well present a possible solution to these issues of funding through faster, more transparent, and cheaper ways of funding. Cryptocurrencies could use decentralized finance (DeFi) solutions to create new ways of crowdfunding and institutional investment in neonatal care services, closing the funding gap [6].

Although cryptocurrencies are adopted in neonatal care, there are some concerns regarding their volatility. Drastic price fluctuations of cryptocurrencies such as Bitcoin and Ethereum are known for making funding healthcare [7] unstable. Additionally, cryptocurrencies are held in a regulatory and legal environment that, although not exactly transparent or completely unified, still restricts the legal extension of the underlying technology, which proves to be a challenge for both regulators and healthcare providers. Such regulatory uncertainty may discourage healthcare institutions from entering into cryptocurrencies, particularly in the neonatal sector, where financial stability is pivotal [8].

There have been many studies on cryptocurrencies and blockchain technology for their ability to disrupt the traditional banking system. There's widespread acknowledgment in studies of the benefits that blockchain can offer to different industries, including healthcare. In the past, several advantages that blockchain provides in terms of transparency, security, and reducing administrative costs have been noted as beneficial features that could increase the efficiency of financial transactions within healthcare [9]. It is possible that blockchain technology can speed up payment systems in healthcare systems, ease patient data management, and increase donations and funds management [10]. Studies have been conducted on the volatility of the prices of cryptocurrencies like Bitcoin and Ethereum. These digital currencies have been documented in several studies to experience dramatic price fluctuations that can be greater than in a short period [11]. One of these risks for industries that rely on the stability of financial backup is the healthcare sector. Specifically, neonatal care units that rely on stable, predictable funding to provide life-saving treatments would be put at a loss after their funds lose value in the market.

There is also a lot of research into the regulatory uncertainty that this new form of money is facing in many jurisdictions. While governments and regulatory bodies try to draw up clear rules for the use of cryptocurrencies, healthcare institutions have been reluctant to adopt digital currencies into their financial operations [12]. Due to the serious consequences that cryptocurrency can cause to the banking system, there have been many studies calling for governments to bring cryptocurrency regulations into a clear and standardized frame of law so as to guarantee the secure transactions, transparency, and legal compliance of all healthcare sectors [13].

Furthermore, some studies have pointed out the possibility of cryptocurrencies to enhance healthcare financing through faster and cheaper transactions. Similarly, a study was made to see how cryptocurrencies and blockchain can help in healthcare financing by cutting down on the administrative costs, peer-to-peer transactions, and transparency as far as fund management is concerned [14]. With all these advantages, the major risks remain very high in an area like neonatal care, where financial stability is a huge need. Even though the utilization of cryptocurrencies to enhance healthcare financing is well established, their acceptability in neonatal care is questionable because of volatility and uncertainty regarding legal factors. Often, financial constraints are experienced in neonatal care services, and the usual funding mechanisms, such as insurance payments, government aid, and charitable contributions, are insufficient to meet the increasing requirement for neonatal care. Security, for bitcoin and other digital currencies, may have advantages for healthcare systems, but the high volatility of those currencies is are substantial risk to healthcare systems that need stable, predictable financial resources. But even more complicated is that there are no clear regulations, which makes health care providers wary of adopting the use of cryptocurrency in paying for neonatal care services.

The study aims to assess the potential of cryptocurrencies, specifically Bitcoin and Ethereum, for financing neonatal care. The study will evaluate the volatility of these cryptocurrencies and their effect on the financial sustainability of neonatal care funding. The adoption of cryptocurrencies in healthcare will also be explored as a risk of currency volatility, regulatory uncertainty, and lack of transaction security. Finally, the research also attempts to review the state of current regulation and to recommend how cryptocurrencies may be embedded into the healthcare financing, specifically neonatal care, in a manner that would mitigate the possible risks.

2. METHODOLOGY

Study Design

The study is based on the assumption of the quantitative assessment of volatility and risk factors of cryptocurrencies in the context of healthcare investments and donations, such as neonatal care, and focuses on Bitcoin and Ethereum. The research used secondary data from cryptocurrency market performance and primary data from a survey of healthcare professionals who were involved in neonatal care finance. This study evaluated the feasibility of using cryptocurrencies as a funding source for neonatal care services, taking into account financial and regulatory factors by evaluating cryptocurrency volatility and perceived risks.

3. DATA COLLECTION

Cryptocurrency Market Data

The data for historical prices of Bitcoin and Ethereum were collected from CoinMarketCap and Binance. The data was for the past 12 months, with daily closing prices to analyze short-term and long-term price fluctuations. Market capitalization data also gave information on liquidity and market behavior. The daily returns of each cryptocurrency were used to assess volatility based on the standard deviation of daily returns. Daily price movements were also captured with the average true range (ATR). The volatility metrics were important for assessing the risks of cryptocurrency investments, especially in neonatal care, where financial stability is crucial.

Healthcare Survey

The survey was conducted electronically to healthcare administrators, neonatal care specialists, and hospital financial officers

of both public and private institutions and large and small healthcare centers in developed and developing regions. The objective of the survey was to determine attitudes towards the use of cryptocurrencies for fundraising and payment systems in neonatal care. The survey contained two sections: the first was about participants' understanding, attitudes and familiarity with cryptocurrencies and blockchain technology in healthcare transactions, especially in the context of neonatal care payments and fundraising, and the second was about the issues of volatility and regulatory landscape, and whether these factors were considered as barriers to the adoption of cryptocurrencies in neonatal care funding. Both quantitative and qualitative data were collected by the survey, which used a combination of Likert scale and open-ended questions to gain professionals' views on cryptocurrency adoption in healthcare.

4. INSTRUMENTS

Volatility Index

The standard deviation of cryptocurrency returns was used as the primary instrument for measuring cryptocurrency volatility and price fluctuations over time. Further, the price was captured with more granularity using its average true range (ATR). These metrics were used to assess the financial risks associated with using cryptocurrencies for neonatal care funding, as high volatility suggested risks that are not suitable for stable funding in healthcare.

Risk Assessment Survey

Statements like the cryptocurrencies are volatile and therefore they are not suitable for healthcare funding, uncertain regulation is a major barrier from adoption of cryptocurrencies in neonatal care and cryptocurrencies present a stable source of funding for neonatal care will be evaluated with a Likert scale (1 – strongly disagree; 5 – strongly agree) Also included will be open ended questions to explore concerns and regulatory changes.

5. DATA ANALYSIS

Volatility Analysis

Descriptive statistics were calculated to understand the volatility of cryptocurrencies using these measures, namely, mean, standard deviation, and range of price fluctuations. Correlation analysis was additionally performed to determine how much volatility patterns were uniform across other cryptocurrencies or if some cryptocurrencies (i.e., Bitcoin) experienced more volatile swings.

Risk Perception Analysis

Quantitative techniques like frequency analysis to identify the most common responses and mean score analysis on the overall sentiment on cryptocurrency risks, were used to analyse the survey data. The data was analyzed using the Likert scale to find out whether healthcare professionals perceived cryptocurrencies as too risky for neonatal care funding or if they thought cryptocurrencies could be a stable alternative to traditional funding mechanisms.

Regression Models

Regression analysis was performed to explore potential predictors of healthcare professionals' willingness to adopt cryptocurrencies. Similarly analysis was carried out to determine if existing factors such as perceived volatility, regulatory concerns, or knowledge of blockchain had a significant effect on willingness to consider cryptocurrencies as a source for neonatal care funding. It helped to identify which factors had the greatest impact on healthcare professionals' decision-making when it comes to the use of cryptocurrencies in their sector.

6. RESULTS

Volatility Findings

As shown in Table 1, Bitcoin has a higher standard deviation in daily returns (6.73%) than Ethereum (6.27%), which means that Bitcoin has slightly more price fluctuation over the 12 months. This means elevated volatility in the neonatal care context, where financial stability is so critical. If the cryptocurrency market fluctuates sharply, the value of such funds earmarked for neonatal care may be lost to serious funding deficiencies in essential services. With somewhat lower volatility, but still involving the notion of risk, Ethereum could be a more stable alternative.

Table 1: Volatility Comparison Between Bitcoin and Ethereum Over 12 Months

Cryptocurrency	Volatility (Standard Deviation)
Bitcoin	6.726148
Ethereum	6.267390

7. SURVEY RESULTS

Demographic Overview

As shown in Figure 1, the survey received responses from Healthcare Administrators (35%), Neonatal Care Specialists (40%), and Financial Officers (25%). This distribution allows for a balanced perspective on the use of cryptocurrencies in neonatal care funding from both the clinical and financial management perspectives. Insight into overall organizational strategy was given by healthcare administrators, clinical needs and challenges by neonatal care specialists, and the feasibility and risk of using cryptocurrencies to fund neonatal care was assessed by financial officers. The diverse sample is representative of the different viewpoints in healthcare institutions.

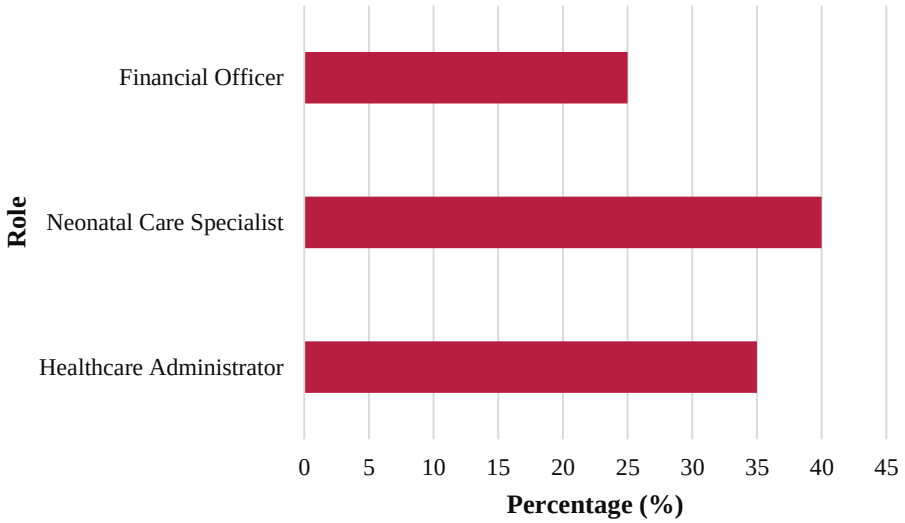

Figure 1: Survey Demographics of Healthcare Professionals

Risk Perception

Figure 2 shows that 60% of respondents think that high volatility is the biggest barrier to using cryptocurrencies for neonatal care funding. This suggests a great deal of uncertainty about the volatility of cryptocurrency prices. Moreover, 25% of the respondents concerned about regulatory uncertainty endorsed the need for clear and stable regulations, so as to adopt cryptocurrencies in healthcare. Nevertheless, 15% of participants perceived cryptocurrencies as a possible stable funding source for neonatal care, indicating that although volatile and confronted with regulatory challenges, some healthcare professionals believe that cryptocurrencies can be a long-term financial solution for neonatal care.

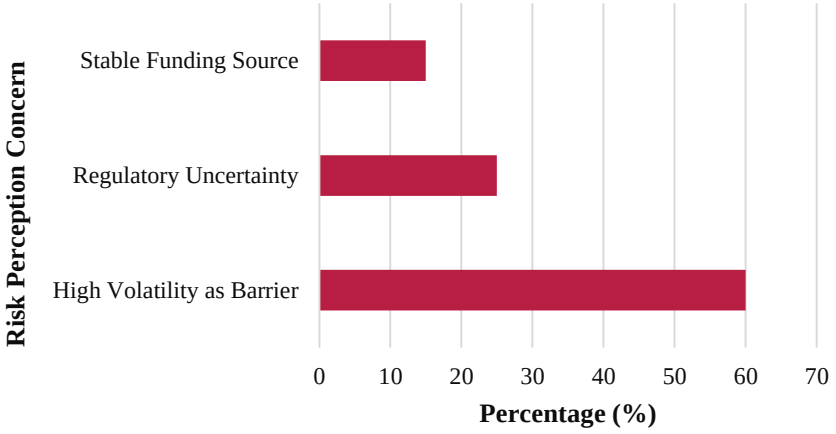

Figure 2: Risk Perception of Cryptocurrencies for Neonatal Care Funding

Adoption Willingness

Table 2 shows the results of the survey on the adoption willingness of cryptocurrencies in neonatal care funding and reveals three key factors: 55% of respondents considered financial viability as the most important factor, and 30% of respondents considered transaction security as the most important factor. Finally, among them, 15 % were persuaded by the fact that cryptocurrency transactions are relatively efficient and would thus speed up the neonatal care funding.

Table 2: Factors Influencing Willingness to Adopt Cryptocurrencies for Neonatal Care Funding

Factor	Percentage (%)
Financial Viability	55
Transaction Security	30
Efficiency	15

Correlation Between Volatility and Risk Perception

The role of the volatility of cryptocurrencies and the risk perception of the healthcare professionals was also explored. Table 3 shows that Bitcoin and Ethereum show a moderate correlation with risk perception, as Bitcoin has higher volatility, whilst relatively better correlated with risk perception (0.75), and Ethereum has lower volatility with a relatively weaker relationship with risk perception (0.65). These results indicate that healthcare professionals may be less likely to adopt cryptocurrencies for neonatal care funding because of a greater perception of higher volatility as a more significant risk.

Table 3: Correlation Between Cryptocurrency Volatility and Risk Perception

Volatility	Risk Perception
6.726148 (Bitcoin)	0.75
6.267390 (Ethereum)	0.65

8. DISCUSSION

This study aimed at examining the possible leveraging of cryptocurrencies, Bitcoin and Ethereum, for funding neonatal care, taking into account the issue of their volatility, risks, and the regulatory challenges associated with it. The research was to understand cryptocurrency price fluctuations on neonatal care financing and healthcare professionals' perceptions on the use of cryptocurrencies as a stable and reliable funding mechanism. Also, the study aimed at the regulatory landscape, owing to which the basis of integrating cryptocurrencies into healthcare systems might have been provided.

Results show that healthcare professionals still consider cryptocurrency volatility to be a major issue, particularly in neonatal care funding. Bitcoin and Ethereum have both been volatile, as price fluctuations were found in both cryptocurrencies, with a tendency for Bitcoin being more volatile compared to a comparable amount on Ethereum (6.73 percent vs 6.27 percent, respectively). The volatility makes stable funding in neonatal care an obvious risk, as financial predictability is of paramount importance. Bitcoin’s higher volatility is similar to past studies that have shown it to be speculative and poses challenges in managing the customary returns from investment. In addition, the majority of respondents in the survey identify high volatility as the major barrier for adoption of cryptocurrency in neonatal care funding, which is consistent with the perception of volatility as a risk factor [15].

While a small number of respondents (15%) still classified cryptocurrencies as a possible stable funding source, their shared opinion of risk around the experiment easily outweighed it. This finding is in line with the study conducted by Radanliev (2024), which reveals that the speculative nature of cryptocurrencies and the unpredictability of the value of these currencies make them unsuitable for sectors in which the financial stability of these currencies is one of the main concerns [16].

According to the survey findings, a negative regulatory uncertainty still poses a major concern to 25 % of respondents, indicating the necessity of clear regulatory frameworks to stem the risks. Given the importance of regulation to avoid adding instability into healthcare systems in general, and most importantly in neonatal care, where financial stability is a sine qua non for the availability of life-saving services, the role of regulation is critical to ensure that cryptocurrencies do not exacerbate further the problem [17]. This study fits within several studies that have investigated the challenges and potential of cryptocurrencies in healthcare. For example, a certain study analysed how blockchain and cryptocurrencies can increase financial efficiency and transparency, which 15% of respondents agreed is a stable funding source. Nevertheless, there is still no comprehensive regulation. As they state, this study’s findings support their contention that, for the time being,

cryptocurrencies are not well suited for use in healthcare because of regulatory and volatility issues [18]. Additionally, the perceived risk associated with high volatility was similar to other sectors such as finance and investment, which have long discussed the high-risk nature of cryptocurrencies [19].

These findings have implications for the role that cryptocurrencies may provide as an alternative funding mechanism for neonatal care, but with significant barriers to overcome. Due to the volatility of both Bitcoin and Ethereum, they are not suitable for direct funding without proper risk management strategies [20]. To limit the impact of volatility on critical care services, healthcare institutions would have to begin adopting financial mechanisms that hedge funds against large price changes, such as stablecoins or hedging strategies, to buffer the impact of volatility on essential care services.

Furthermore, it also points out the urgency for a definite regulatory environment to let cryptocurrencies be effectively launched into the healthcare systems. Lack of these regulations could leave healthcare providers reluctant to adopt cryptocurrencies as they are mindful of the lurking fraud, mismanagement, and issues related to legal compliance. To ensure that cryptocurrencies can be used in a secure and stable way for healthcare funding, governments and international organizations would have to collaborate to set up policies [21].

This study has some limitations. The responses to the survey may not reflect the views of the global healthcare system, as these responses are limited to a narrow group of healthcare professionals. The survey was not aimed at all potential stakeholders in neonatal care, including government health officials or patients. Secondly, the consideration for cryptocurrency volatility analysis only occurred on Bitcoin and Ethereum while omitting all other cryptocurrencies susceptible to volatilities and distinct market behaviors. The study also ended on a 12-month window, which is perhaps less than adequate time to review long-term trends or the evolving regulatory landscape that could influence takers in the adoption of cryptocurrencies in the future. Future research should expand the survey sample to include additional healthcare professionals and stakeholders to address the limitations of the survey. Further, future works possibly would examine the feasibility of employing stablecoins and other less volatile cryptocurrencies for the financing of neonatal health. Such monitoring would be useful in light of the evolving regulatory landscape, indicating how changes in cryptocurrency regulations affect adoption in the healthcare sector. Other cryptocurrencies also needed to be tracked for extended periods to assess their volatility on the overall income of the funding for healthcare. Moreover, blockchain technology can be studied in other aspects, especially how it can be applied to improve transparency, traceability, and security in the use of healthcare financial transactions. Finally, the study may be conducted for the feasibility of a hybrid system, that is, traditional transactions with cryptocurrency, offering a more balanced and stable solution for neonatal care funding in the future.

9. CONCLUSION

This study aimed to examine the possibility of using cryptocurrencies such as Bitcoin and Ethereum to finance neonatal care in view of their volatility, risk, and regulatory issues. The results showed that both cryptocurrencies have high volatility, and Bitcoin is more volatile than Ethereum. This poses a barrier to stable funding in neonatal care due to the need to maintain financial predictability in order to provide stable care. The results of the survey showed that most of the healthcare professionals see high volatility and regulatory uncertainty as major barriers to the adoption of cryptocurrencies in neonatal care funding. However, a few respondents acknowledged the possibility of cryptocurrencies as an alternative source of funding and hence some form of optimism about their role in the future. The findings show that cryptocurrencies could also be a new and quick means to raise funds for neonatal care, but with the volatility and blurred regulatory framework associated with them, they are not the most reliable option for an avenue to financial sustenance. To become viable for healthcare financing, cryptocurrencies would need to be explored by institutions for risk management, such as with the use of stablecoins or hedging techniques against the impact of price fluctuations. In addition, regulatory frameworks for cryptocurrencies in the healthcare systems must be established to guarantee the secure and reliable use of cryptocurrencies. Although the study was helpful, there were some limitations, including the small number of healthcare professionals who responded to the survey as well as the limited scope of Bitcoin and Ethereum. Further research needs to be carried out on a larger sample that includes a wider range of cryptocurrencies and stakeholders involved in this market. Furthermore, studies for the long term are necessary to see how the regulatory landscape shifts and how it impacts the acceptance of cryptocurrencies in the healthcare sector. Future work integrating digital currency and blockchain technology with neonatal care can be based on this work to enable the use of the same in the area of healthcare financing, stably and securely.

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