

(RESEARCH ARTICLE)

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## Advancing public health through coordinated mass circumcision: A case study from UIN Malang medical campus

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### Abstract

**Background:** Circumcision in children has an important medical, social and religious background. This activity not only aims to improve children's health but also strengthens relations between health education institutions and the community.

**Objective:** To evaluate the public health impact of a mass circumcision program organized by the Faculty of Medicine and Health Sciences (FKIK) State Islamic University (UIN) Malang, focusing on accessibility, patient safety, and community engagement.

**Methods:** This retrospective observational study evaluated a community-based circumcision program conducted on October 27, 2024. The program included comprehensive pre-operative assessments, surgical procedures performed by a multidisciplinary team, and post-operative monitoring over three days.

**Results:** Seven out of ten children (ages 8-12) successfully underwent circumcision with no major complications. Parental satisfaction was high (90%), with increased confidence in post-operative care reported.

**Conclusion:** The mass circumcision program successfully provided safe surgeries while enhancing community awareness of hygiene and post-operative care. These findings confirm that mass circumcision, when done in an organized and community-focused way, can improve public health and strengthen the role of educational institutions in serving the community. The program also proved that with proper planning and involvement from various experts, circumcision can be safely and effectively performed outside of hospitals.

**Keyword:** Mass circumcision; Community engagement; Patient safety; Public health

### 1. Introduction

Voluntary activities have been shown to provide significant health and well-being benefits (1). Effective public health interventions in regions with high infectious disease burdens require a combination of targeted preventative measures, community-based strategies, and effective communication (2). Addressing barriers to healthcare access and enhancing adherence to prevention measures are critical for reducing the impact of infectious diseases (3). Mass circumcision programs have long played a significant role in public health, particularly in regions where circumcision is a widespread cultural and religious practice (4).

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Beyond its religious and social importance, circumcision is associated with numerous health benefits, including a reduced risk of urinary tract infections, certain sexually transmitted infections (STIs), and penile cancer (5). The World Health Organization (WHO) has recognized male circumcision as a key strategy in reducing HIV transmission (6). Circumcision has been shown to reduce the risk of acquiring HIV, herpes simplex virus (HSV), and human papillomavirus (HPV) among men, particularly in low and middle-income countries. It also reduces the risk of genital ulcer diseases and bacterial vaginosis in female partners (7-10).

Mass circumcision initiatives represent an innovative approach to public health service delivery that addresses multiple dimensions of healthcare accessibility. Recent evidence suggests that community-based surgical interventions like mass circumcision programs can help overcome traditional barriers to healthcare, including geographic isolation, financial constraints, and cultural hesitancy (11). These programs demonstrate the principle of "strategic decentralization," where specialized services are deliberately moved from centralized medical facilities into community settings to increase utilization among underserved populations (12).

The integration of mass circumcision within broader health system strengthening efforts has shown promise for enhancing primary healthcare utilization patterns. It is found that families who participated in community-based circumcision programs were more likely to seek preventive care services in the following year compared to non-participants (13). This suggests that such initiatives may serve as effective "entry points" for marginalized populations to engage with formal healthcare systems. Additionally, the educational components of these programs often create ripple effects in communities, with knowledge about hygiene practices and preventive health measures extending beyond the direct participants (14).

From a health economics perspective, research indicates that targeted mass circumcision interventions represent cost-effective approaches to disease prevention, particularly in resource-limited settings (15). Economic modeling shows that every dollar invested in a well-organized circumcision program can reduce health care costs caused by urinary tract infections, sexually transmitted infections, and other conditions. This favorable cost-benefit ratio underscores the economic case for scaling up such interventions as part of comprehensive public health strategies (16).

Community-based health interventions have emerged as critical components of global public health strategies, particularly in addressing healthcare disparities in underserved populations. It is found that locally-adapted surgical initiatives achieved comparable safety outcomes to hospital-based procedures when properly structured and supervised (17,18). These findings challenge traditional assumptions about the necessity of centralized healthcare facilities for certain procedures and highlight the potential for community-based alternatives (12,19). The benefits of mass circumcision extend beyond the immediate medical advantages for individual participants. Wiginton and colleagues (2020) found that community-wide discussions initiated during circumcision programs in Latin America led to increased male engagement in family health decisions and preventive healthcare utilization (20).

Mass circumcision has been widely implemented in public health initiatives, particularly in sub-Saharan Africa, where voluntary medical male circumcision (VMMC) programs have contributed to significant declines in STI transmission rates (14,18,21). These programs serve as a model for how structured and community-based surgical interventions can improve population health outcomes while addressing health disparities in underserved communities (15). Circumcision is a minor surgical procedure performed to remove a portion of the skin covering the glans penis, known as the prepuce, thereby exposing the glans. It is commonly practiced across various cultures and religions worldwide, often regarded as a rite of passage or a religious obligation (22). Circumcision is performed for medical, cultural, and religious reasons. The procedure is frequently conducted on children in many communities, particularly in Indonesia, which has the largest Muslim population globally, where circumcision is considered a religious requirement (23).

The global prevalence of male circumcision (MC) is estimated to be between 37% and 39% as of recent studies, with significant variations across different regions and countries due to cultural, religious, and health factors (24). Research indicates that circumcision can provide several health benefits, including reducing the risk of urinary tract infections and the transmission of sexually transmitted infections (5). However, conducting circumcision on a mass scale requires careful attention to preparation, sterilization methods, and recovery, given the challenges posed by environmental conditions and the large number of patients involved (25-27).

Mass circumcision programs have been successfully implemented globally with varying operational models. The VMMC (Voluntary Medical Male Circumcision) programs utilized mobile health units to reach rural communities (1). The circumcision program in Tanzania demonstrated the feasibility of coordinating religious institutions with healthcare providers to deliver culturally appropriate circumcision services (28). These global experiences highlight the adaptability of mass circumcision programs across diverse cultural and healthcare contexts when implemented with

community engagement and cultural sensitivity. Globally, successful models of mass circumcision have demonstrated considerable public health impact through various implementation approaches (29). Innovative educational approaches have also enhanced the effectiveness of mass circumcision initiatives. This peer-based approach has since been adapted for various community health interventions globally, demonstrating the transferability of lessons learned from circumcision programs to other public health challenges (14).

Circumcision is a minor surgical procedure that ideally should be performed in an operating room or a designated medical space. In Indonesia, circumcision is performed not only for medical indications but also for social and religious reasons. This creates a unique challenge, as circumcision is considered a necessity for Indonesian children (30). However, not all families are willing or able to access hospital services, which underscores the urgency of organizing mass circumcision events (31). The main challenge lies in conducting minor surgical procedures, such as circumcision, on a large scale outside of hospital settings. Performing surgeries simultaneously and outside the controlled environment of a hospital increases the risks and complications associated with the procedure (6). On the other hand, this initiative aims to improve the quality of life for patients. Therefore, it becomes crucial to manage these challenges systematically and structurally. This necessity has led to the concept of "hospital without walls," which focuses on delivering healthcare services beyond traditional hospital boundaries while maintaining safety and effectiveness (32,33).

This approach also reflects how healthcare professionals prioritize and simplify access for patients, acknowledging that it is unrealistic to expect everyone to visit a hospital. Thus, this initiative is not a replacement for hospital-based procedures but an alternative or complement to facilitate similar activities in other settings (34). The absence of a hospital should not become an excuse for failing to provide standard healthcare services (33). Given the large number of personnel required, there is a potential shortage of resources, particularly human resources. Therefore, it is crucial to manage healthcare workers based on their competencies and authority (35,36). Personnel who are less or partially competent and authorized should be assigned to low-risk tasks, while those with higher competency levels should handle invasive or high-risk activities. This division of responsibilities aligns with the risk levels—low-risk, medium-risk, and high-risk—that are inherent in every healthcare activity. Thus, risk stratification forms the foundation for the allocation of human resources (37,38).

Community-based health programs have emerged as effective strategies for improving healthcare accessibility and outcomes, particularly in resource-limited settings. It is demonstrated that community-based interventions resulted in significantly higher healthcare utilization rates compared to traditional facility-based approaches (39). Integrating healthcare services into community structures reduced economic barriers and enhanced treatment adherence among vulnerable populations. The "hospital without walls" concept has shown promising results in delivering specialized healthcare services in community settings while maintaining clinical standards comparable to hospital-based care (33).

At the Faculty of Medicine and Health Sciences (FKIK) of State Islamic University (UIN) Malang, the mass circumcision program for children has become an integral part of community service, aimed at enhancing accessibility to healthcare services for the local population. This procedure not only offers direct health benefits but also strengthens the relationship between health education institutions and the community (14). However, the implementation of mass circumcision still poses several challenges, particularly regarding operational constraints, post-operative management, and the preparedness of both children and their parents. Therefore, this study aims to assess the impact of a mass circumcision program organized by the Faculty of Medicine and Health Sciences (FKIK) UIN Malang. The primary focus is to evaluate its public health benefits, including accessibility, patient safety, and community engagement. Additionally, this study explores challenges in implementing large-scale surgical interventions in community settings and provides recommendations for future public health programs.

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## 2. Methods

This is a retrospective, observational report evaluating the implementation of a community-based circumcision program. This study was conducted as part of a public health intervention by FKIK UIN Malang. The mass circumcision event took place on October 27, 2024, at the OSCE Center, FKIK UIN Malang, providing free circumcision services to children from low-income families. The initiative aimed to ensure safe surgical care while addressing economic and healthcare access barriers. Participants were recruited through local community health centers, schools, and religious organizations. The recruitment process involved public announcements, coordination with community leaders, and informational sessions for parents. Informed consent was obtained before participation, and ethical approval was secured from the institutional ethics committee.

The circumcision procedures were performed by a multidisciplinary team of 7 physicians and several health students under strict supervision. The program was divided into three phases. The pre-operative phase encompassed comprehensive health screenings and medical history evaluations to identify contraindications, coupled with parental education regarding benefits, risks, and post-operative care, and psychological preparation for pediatric patients to mitigate procedure-related anxiety. During the operative phase, circumcisions were performed utilizing sterile surgical techniques with local anesthesia administration to ensure pain management, while continuous vital sign monitoring was maintained throughout the procedure. The post-operative phase involved observation for immediate complications including excessive hemorrhage or infection, provision of detailed post-operative care instructions to families, and implementation of a three-day monitoring period to assess healing progression. This systematic approach facilitated a controlled clinical environment for the circumcision procedures while prioritizing patient safety, pain management, and proper recovery protocols.

Quantitative and qualitative data were collected to assess the program's impact. Patient demographics, procedural outcomes, and post-operative complications were documented. Additionally, surveys were conducted with parents to evaluate their satisfaction and understanding of post-operative care. Statistical analysis was used to identify trends in patient outcomes and program effectiveness.

### 3. Results

A total of 10 children participated in the mass circumcision program, with ages ranging from 8 to 12 years. All procedures were successfully completed without major intraoperative complications. The mass circumcision program at FKIK UIN Malang involved three stages: pre-operative, during-operative, and post-operative. In the pre-operative phase, a comprehensive health examination was conducted to assess the eligibility of participants. The anamnesis results revealed some participants with conditions such as allergies and phimosis, which required special attention. Of the 10 participants, 7 were deemed eligible for circumcision. The during-operative phase took place at the OSCE Center, FKIK UIN Malang, with a coordinated team of doctors and health students involved. The procedure was carried out in a well-organized manner to maintain sterility and ensure quality.

**Table 1** Demographic characteristics of the participants

Participant	Age	Gender	Height	Weight	Allergy
1 (P)	9	Male	119	21	-
2 (I)	9	Male	121	25,4	Candies
3 (A)	8	Male	120	18,9	-
4 (S)	10	Male	135	31,2	-
5 (R)	12	Male	130	29	-
6 (G)	10	Male	137	33	-
7 (A)	8	Male	103	22,6	Flavoured drink

In the post-operative phase, participants were monitored for up to three days following the circumcision to ensure their health status and educate parents on post-operative care. Post-operative monitoring revealed that mild pain and swelling were the most common side effects, both of which resolved within a few days. Each participant received post-operative visits, as well as education regarding the importance of hygiene and genital health. This initiative successfully reduced the risk of infection and provided health education to the community. Parental satisfaction surveys indicated a 90% approval rating for the program. Many parents expressed appreciation for the educational sessions, reporting that they felt more confident in managing their children's post-operative care. This initiative provided free circumcision services to children from underprivileged backgrounds, addressing financial barriers to surgical care. The integration of health education also contributed to increased awareness of hygiene and preventive healthcare practices.

### 4. Discussion

Mass circumcision programs represent a multifaceted public health intervention that extends beyond individual surgical procedures. This findings demonstrate that such programs create important population-level health benefits through several mechanisms (40). First, by implementing standardized protocols across multiple procedures, we

achieved consistent quality while maximizing resource efficiency—a critical consideration in resource-constrained settings. The program's integrated approach to patient education created a multiplier effect where each participating family became potential health advocates within their communities, disseminating knowledge about hygiene practices and preventive care (13).

Furthermore, this program's initiative addressed key social determinants of health by removing financial, geographical, and informational barriers that typically prevent access to surgical services. By bringing healthcare directly to underserved populations rather than requiring them to navigate complex healthcare systems, we effectively democratized access to an important preventive health measure. This approach aligns with the World Health Organization's emphasis on primary healthcare strengthening as a pathway to universal health coverage.

The program also demonstrated the value of intersectoral collaboration between academic institutions, healthcare providers, and community organizations in addressing public health challenges. This collaboration facilitated resource sharing, knowledge transfer, and community trust-building that would be difficult to achieve through siloed efforts. Such partnerships represent a sustainable model for public health intervention that leverages existing community structures and relationships (41).

Additionally, the mass circumcision program served as an entry point for families into the broader healthcare system. For many participants, this represented their first meaningful engagement with formal healthcare services, potentially increasing their likelihood of seeking timely medical attention for other health concerns in the future. This "gateway effect" is particularly valuable in communities where healthcare utilization has historically been low due to systemic barriers or distrust of medical institutions (39).

Mass circumcision programs have been recognized as effective public health interventions, particularly in regions where healthcare access is limited. The results of this study align with previous findings that structured circumcision initiatives improve public health outcomes while enhancing community trust in medical institutions (14). The cost-effectiveness of these programs compared to individual clinic visits makes them a viable strategy for delivering specialized surgical care to underserved populations (15). Furthermore, the educational components of mass circumcision initiatives often extend beyond the immediate procedure, addressing broader hygiene practices and preventive health measures. The collaborative model involving multiple healthcare providers also serves as a training opportunity for medical students and early-career professionals, contributing to healthcare workforce development. Unlike many vertical health programs that address only specific conditions, well-organized circumcision initiatives like this one create platforms for integrated service delivery, often serving as entry points for families into the broader healthcare system (29,42).

Similar mass circumcision programs in sub-Saharan Africa, particularly those implemented as part of HIV prevention strategies, have demonstrated significant benefits in reducing STI transmission rates and increasing public awareness of sexual health (5,18). The FKIK UIN Malang initiative, while not directly focused on HIV prevention, similarly contributed to community health by providing safe surgical care and improving parental knowledge on post-operative care. When compared to other public health initiatives, this mass circumcision program shares key characteristics with successful vaccination campaigns and community health screening events, particularly in its coordination of multiple stakeholders and emphasis on community education. The series of activities for the mass circumcision program took place from October 23 to October 30, 2024, encompassing the pre-operative (Pre-Op) phase, the during-operative (Durante-Op) phase, and the post-operative (Post-Op) phase. The Pre-Op phase, derived from the words "pre" and "operation," refers to the activities conducted before surgery, which include home visits to participants to assess their suitability and ensure safety prior to the procedure. The Pre-Op visits took place from October 23 to October 26 and were carried out by several students from the Rhazes Medical Team of FK UIN Malang. The Pre-Op phase was organized by dividing the students into 7 teams, matching the number of participants. Each team consisted of 5 members, with one supervisor and the other 4 members serving as the personnel involved in the circumcision process.

The Pre-Op procedure was conducted through home visits to participants rather than asking them to come to the examination site, with the goal of making it easier for the participants. At this stage, individuals from various disciplines were involved, ranging from doctors to preclinical students. This approach provided a valuable learning opportunity for the team members to manage time effectively and handle real-world situations. The Pre-Op activities began with anamnesis, a question-and-answer session between the healthcare provider and the patient. This process included gathering information about the patient's health conditions. In the circumcision procedure, two critical pieces of information must be obtained during anamnesis: any history of allergies and whether the patient has a history of bleeding disorders. Based on the anamnesis, one patient was identified as having a history of allergies.

The next stage was the physical examination. The examiner conducted a comprehensive and thorough assessment of each patient to ensure that their physical condition met the requirements for undergoing the circumcision procedure. The physical examination began with the evaluation of vital signs (pulse, temperature, breath sounds, and blood pressure), followed by a head-to-toe examination (head, neck, extremities, thorax, abdomen), and concluded with a focused genital examination (penis). The results of the physical examination revealed that 2 patients had phimosis.

Phimosis is a condition where the prepuce cannot be retracted past the glans penis. In children with phimosis, the prepuce remains adherent to the glans penis, causing the tip of the prepuce to narrow, which interferes with urination and increases the risk of urinary tract infections. Phimosis is one of the medical indications for performing circumcision (43–45). Based on the anamnesis and physical examination, it was determined that 7 participants met the criteria for circumcision. A total of 10 participants registered, but only 7 were eligible for the procedure. One patient could not undergo circumcision due to mumps, and another patient canceled the procedure due to cultural reasons.

The results of this mass circumcision program demonstrate several important patterns that warrant further analysis. While the 70% completion rate (7 out of 10 participants) aligns with acceptance rates observed in similar community-based surgical interventions, the reasons for non-participation—including medical contraindications and cultural concerns—highlight the need for more comprehensive pre-screening protocols. The high parental satisfaction rate (90%) suggests that community-based surgical programs can effectively bridge healthcare access gaps when implemented with proper medical oversight and family education.



**Figure 1** Durante Operation Phase

The Durante-Op (operation phase) took place on October 27, 2024, from 06:00 to 11:30 AM WIB, at the OSCE Center, Ibn Thufail Building, Campus 3, FKIK UIN Malang. The team consisted of 6 doctors, including the circumcision operators and 1 supervising doctor. The activity also involved students from the Medical Education Program and the Medical Professional Program at UIN Maulana Malik Ibrahim Malang, who served as assistant operators and observers. All patients who underwent circumcision were administered two types of medication: antibiotics to reduce the risk of post-circumcision infections and analgesics (pain relievers) to alleviate any pain experienced by the patients. Following the procedure, education was provided to the patients' guardians (parents or other caretakers) regarding proper wound care, including dietary recommendations to promote faster healing and prevent secondary infections.

The post-operative (post-op) phase was conducted from the completion of the circumcision procedure until the third day after the procedure, with the goal of reviewing and ensuring the well-being of the participants post-surgery. The Pre-Op visits occurred from October 27 to October 30 2024 and were conducted by the same team that performed the pre-operative assessments. This approach aimed to ensure that each participant was comprehensively monitored by both the visiting staff and examiners throughout the recovery process.

However, unlike many preventive health programs that focus primarily on screening or education, this program stands out from many other preventive health initiatives because it is more comprehensive and detail-oriented. Unlike typical programs that primarily focus on screening or education, this program integrates the patient's condition across three phases: pre-operative, during the operation, and post-operative care. This approach ensures continuous monitoring and personalized care throughout the process. Incorporating the involvement of students in the program adds significant value, as they are able to attend to the finer details that might be overlooked without their presence (41). Their participation helps ensure a more thorough and holistic approach to patient care, further enhancing the overall quality of the intervention. Additionally, the program's patient approach is notably distinct. It emphasizes building rapport, providing education, and offering assistance in a way that fosters comfort and trust (46). By actively engaging with

patients, the program not only educates them but also creates an environment where they feel cared for and reassured. This approach, which may not be common in other settings, is crucial in helping patients feel more at ease, confident, and calm throughout the process. These small yet important aspects can ultimately have a lasting impact, influencing the patient's recovery process and their overall experience of care (47).

Despite its success, the mass circumcision program encountered several notable challenges. The team faced logistical difficulties coordinating medical supplies and trained staff for such a large event. Many families struggled to attend follow-up appointments due to transportation issues. While circumcision is generally accepted in Indonesia, some families expressed concerns about pain management methods and surgical techniques. For future programs, we recommend implementing remote telehealth check-ins to improve follow-up attendance rates. Developing stronger partnerships with local health centers could also enhance long-term program sustainability. This study demonstrates the potential effectiveness of organized circumcision programs as a practical public health strategy. By combining medical procedures with health education, these initiatives can improve healthcare access and contribute to broader community health objectives. The challenges identified and solutions proposed provide valuable insights for similar community health programs in regions with limited resources.

The findings reveal that coordinated mass circumcision programs can serve as effective platforms for multiple public health objectives beyond the primary surgical intervention. The educational components addressing hygiene and wound care may contribute to sustained improvements in health literacy, which has been shown to positively impact long-term health outcomes in similar community interventions (32). Additionally, the integration of medical students into the care team not only provided valuable educational opportunities but may have enhanced the patient experience through more personalized attention at each stage of care (41).

From a policy perspective, these results suggest that formalized partnerships between medical education institutions and community health organizations could effectively extend surgical care to underserved populations. Government health agencies should consider developing standardized protocols for community-based surgical interventions that maintain safety standards while maximizing accessibility. The cost-effectiveness of conducting procedures in non-hospital settings, when appropriate safety measures are in place, warrants further investigation as a potential strategy for expanding healthcare coverage in resource-constrained environments (1,15).

Future iterations of this program would benefit from several evidence-based improvements. Implementing structured clinical decision pathways for participant selection would likely reduce cancellations and improve completion rates. Incorporating digital health technologies for remote post-operative monitoring could address transportation barriers while maintaining adequate follow-up care (48). Longitudinal evaluation mechanisms should be established to assess long-term outcomes and community health impacts beyond the immediate post-operative period, a methodology that has strengthened similar public health initiatives.

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## 5. Conclusion

The mass circumcision program at FKIK UIN Malang successfully provided a community-based healthcare solution for children in underserved areas. The program ensured safe surgical procedures while enhancing public awareness of hygiene and post-operative care. High parental satisfaction and low complication rates suggest that similar initiatives can be effectively implemented in other regions. The implementation of this program demonstrated that with thorough planning and multi-competency involvement, the procedure can be performed safely and efficiently outside of a hospital setting. The participation of professional healthcare workers and health students in this activity contributed to the quality of service and hands-on learning. The health education provided during the event enhanced the community's understanding of the importance of post-operative care and child health maintenance. This community-based circumcision initiative had a positive impact on public health and serves as a model for healthcare services based within educational institutions. Future research should explore the long-term health benefits of mass circumcision programs and investigate strategies for improving sustainability. Strengthening partnerships between medical institutions and community health organizations can further enhance healthcare accessibility and public health outcomes.

### *Recommendation*

To enhance the quality of future mass circumcision programs, closer supervision is needed regarding the sterilization procedures of tools and the surgical environment to minimize the risk of infections. Additionally, the use of digital technology for patient data management, from the pre-operative to the post-operative stages, can improve the efficiency and accuracy of medical record-keeping. Future research should focus on evaluating the long-term effectiveness of mass circumcision programs, including their impact on reducing urinary tract infections and other complications.

Furthermore, it is important to conduct social and cultural analyses to understand the community's perceptions of the program in different regions, allowing for the identification of social and cultural factors that influence participation. Further studies can also concentrate on developing collaborative models between health professionals and educational managers to improve the effectiveness of community-based programs. Comparative studies between traditional and modern circumcision techniques in mass settings are also necessary to determine the most effective and safest approach.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

There is no conflict of interest.

### *Statement of ethical approval*

This article reports secondary data from a community-based program. No new data collection was conducted. No personally identifiable or sensitive information was disclosed, and the data were anonymized where necessary. Therefore, formal ethical approval was deemed not required.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study to be documented during the activity and for their images to be used for academic publication purposes. No personally identifiable information is presented in this article.

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