



## Cancer drug resistance is a serious threat in Bangladesh

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### ABSTRACT

Cancer drug resistance is a serious issue in Bangladesh that must be addressed with effective solutions. The growth of resistant bacterial strains, inappropriate use of antimicrobials, and inadequate healthcare standards in Bangladesh have resulted in a severe problem with cancer medication resistance. A comprehensive strategy will be needed to address these problems, one that includes expanding knowledge of antibiotic resistance, bettering healthcare system regulation, and developing more potent cancer therapies.

Bangladesh has a noteworthy cancer situation with a high cancer burden. According to the Global Cancer Observatory age-standardized incidence rate of cancer is 106.2 in Bangladesh. The nation had 156,775 cancer cases (0.10% of the total population) and 108,990 cancer deaths (0.07% of the total population) in 2020 (Fig. 1). The cervical cancer is the second most frequent disease in females in Bangladesh with 8068 cases and 5214 deaths and the fourth most common cancer in women worldwide.<sup>1</sup> Furthermore, the most common malignancies are those of the mouth, throat, oesophagus, stomach, cervix uteri, and lung cancer in Bangladesh. It is critical to recognise and manage the cancer burden in Bangladesh since the nation is grappling with the weight of both non-communicable and communicable illnesses.<sup>2</sup> In order to prevent cervical cancer, the public and commercial sectors are collaborating on screening programmes and HPV vaccination campaigns.<sup>1</sup> The cancer situation in Bangladesh is highlighted in a country profile released by the WHO in 2020, highlighting the importance of the problem.<sup>3</sup>

A significant barrier to successful treatment approaches against cancer in Bangladesh is multidrug resistance. Although chemotherapy is seen to be one of the most promising forms of cancer treatment, tumour

cells become resistant to it, causing it to fail in around 90% of instances. Depending on the kind of cancer, impoverished nations may not have access to certain therapies and preventative measures, and even industrialised nations may have challenges in treating cancer because of rising drug resistance. Numerous strategies, such as immunoprevention, therapeutic techniques, and a knowledge of molecular pathways, have been proposed to counter drug resistance. Furthermore, enabling Bangladeshi communities to develop social capital and cohesiveness would allow them to make more contributions to the nation's economic and social wellbeing, which will assist prevent and manage antibiotic resistance.<sup>5–7</sup>

The rising incidence of multidrug-resistant cancer cells (MDR-C) in Bangladesh has raised concerns about cancer medication resistance (Fig. 2a and b). Since many cancer therapy approaches are inefficient against MDR-C, MDR constitutes a significant barrier to successful therapeutic treatments.<sup>5</sup> Antimicrobial resistance (AMR) is a developing problem in Bangladesh that affects both the human and animal health sectors.<sup>6</sup> According to research in Bangladesh, antimicrobials were administered for 50% of outpatient prescriptions in three cities; 25% of these prescriptions included more than one antibiotic, and 83% of these prescriptions were written without a lab test. It was also shown that a significant percentage of patients (69% of them) stopped taking antimicrobials as soon as their symptoms started getting better. The poor regulatory framework in Bangladesh, which has limited ability to monitor the sizable antimicrobial market, exacerbates this scenario.<sup>6</sup> Regarding tuberculosis (TB) therapy, the "9-month Bangladesh regimen" was beneficial in treating over 500 consecutive patients with extensively drug-resistant TB (XDR-TB), according to research conducted in Bangladesh on the efficacy and safety of standardised shorter regimens for multidrug-resistant TB. The majority of the patient data in the study came from the Bangladesh study, and one ongoing, unpublished study was left out, among other limitations.<sup>8</sup>

The problem of cancer drug resistance is a serious obstacle in Bangladesh, like in many other countries. Future proposals to address this could centre on creating treatment methods, investigating immunoprevention techniques, and comprehending the molecular causes of multidrug resistance (MDR) in cancer. Drugs that can be delivered to certain molecular targets, together with immunoprevention, microparticles, and nanomedicine to combat drug resistance, are thought to be

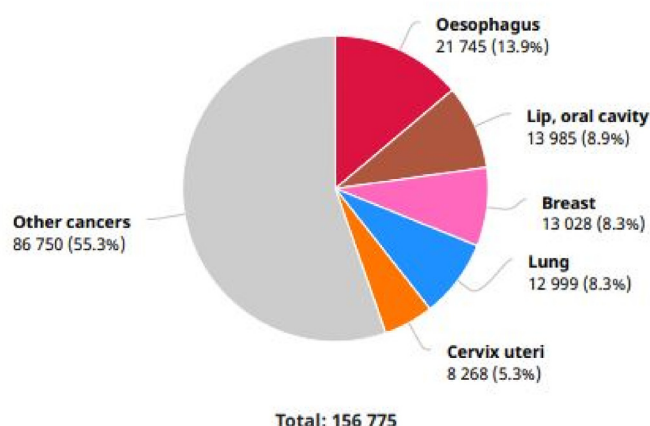


Fig. 1. Number of new cancer cases in Bangladesh in 2023.<sup>4</sup>

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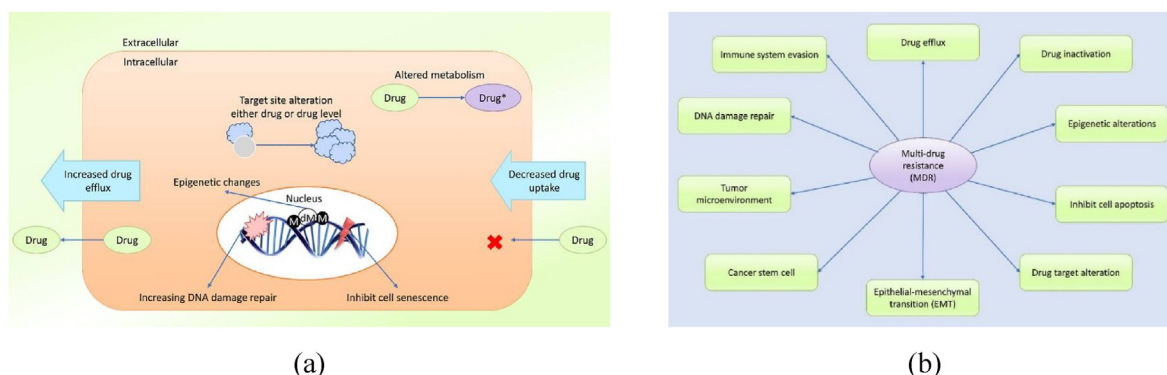


Fig. 2. (a) Various potential mechanisms contribute to multidrug resistance and (b) Schematic presentation of possible drug resistance mechanisms in cancer.<sup>5</sup>

necessary for defeating MDR in cancer cells. Concerning anticancer medication usage and resistance development, it is also critical to take legislative and regulatory issues into account. Developing successful plans to counter cancer medication resistance in Bangladesh would require cooperation between researchers, medical personnel, and policymakers.

The extant literature highlights the necessity of adopting a holistic strategy that considers the molecular, immunological, and therapeutic elements of MDR in order to fully comprehend and manage cancer drug resistance. In the context of drug resistance, another important element that must be taken into account is Bangladesh's regulatory framework around the use of antimicrobials. Future proposals should thus take a multidisciplinary approach to addressing the clinical, scientific, and regulatory aspects of this intricate problem.

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#### CRediT authorship contribution statement

**Miah Roney:** Data curation, Formal analysis, Methodology, Validation, Writing – original draft. **Mohd Fadhilzil Fasihi Mohd Aluwi:** Conceptualization, Investigation, Supervision, Validation, Writing – review & editing.

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