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SPECIAL ARTICLE

Reducing maternal mortality due to elective abortion: Potential impact of misoprostol in low-resource settings

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Abstract Over 99% of deaths due to abortion occur in developing countries. Maternal deaths due to abortion are preventable. Increasing the use of misoprostol for elective abortion could have a notable impact on maternal mortality due to abortion. As a test of this hypothesis, this study estimated the reduction in maternal deaths due to abortion in Africa, Asia and Latin America. The estimates were adjusted to changes in assumptions, yielding different possible scenarios of low and high estimates. This simple modeling exercise demonstrated that increased use of misoprostol, an option for pregnancy termination already available to many women in developing countries, could significantly reduce mortality due to abortion. Empirical testing of the hypothesis with data collected from developing countries could help to inform and improve the use of misoprostol in those settings.

1. Introduction

Unsafe abortion is a preventable public health threat in developing regions, where over 99% of deaths due to abortion occur [1]. This article assesses the potential of misoprostol (Cytotec®, Pfizer, New York, NY) to induce elective abortion as a simple intervention to reduce maternal mortality. To explore this hypothesis, estimates of the mortality reductions possible if misoprostol were to replace riskier abortion techniques are presented.

Medical abortion has been shown to be safe and effective in developing countries [2–4]. It does not require anesthesia or a hospital setting, and holds promise to increase access to safe abortion where surgical abortion is unsafe or unavailable. The World Health Organization (WHO) added mifepristone and misoprostol to its Essentials Medicines List for developing countries [5]. Mifepristone is expensive and is not approved in many countries. Misoprostol, a prostaglandin E_1 analogue, is inexpensive, stable at room temperature, widely

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Table 1 Estimates of deaths due to abortion in developing regions

Number unsafe abortions [1]	Number maternal deaths to unsafe abortion	Proportion attempting medical abortion (%)	Estimated mortality to medical abortion (deaths per 100,000 abortions) [a]		Estimated number deaths to medical abortion [b]	Estimated number maternal deaths to all abortions	Estimated percent reduction maternal deaths
			1st trimester	2nd trimester			
Developing regions							
18,400,000	67,500						
		20	20	200	1781	57,266	15.2
		20	10	100	891	56,376	16.5
		40	20	200	3562	47,032	30.3
		40	10	100	1781	45,251	33.0
		60	20	200	5343	36,798	45.5
		60	10	100	2672	34,127	49.4
		80	20	200	7124	26,564	60.6
		80	10	100	3562	23,002	65.9
Africa							
4,200,000	29,800						
		20	20	200	407	24,902	16.4
		20	10	100	203	24,699	17.1
		40	20	200	813	20,004	32.9
		40	10	100	407	19,598	34.2
		60	20	200	1220	15,106	49.3
		60	10	100	610	14,497	51.4
		80	20	200	1626	10,209	65.7
		80	10	100	813	9396	68.5
Asia [c]							
10,500,000	34,000						
		20	20	200	1016	28,964	14.8
		20	10	100	508	28,456	16.3
		40	20	200	2033	23,929	29.6
		40	10	100	1016	22,912	32.6
		60	20	200	3049	18,893	44.4
		60	10	100	1525	17,369	49.8
		80	20	200	4066	13,858	59.2
		80	10	100	2033	11,825	65.2
Latin America							
3,700,000	3700						
		20	20	200	358	3400	8.1
		20	10	100	179	3220	13.0
		40	20	200	716	3000	16.2
		40	10	100	358	2714	25.9
		60	20	200	1074	2799	24.4
		60	10	100	537	2261	38.9
		80	20	200	1433	2498	32.5
		80	10	100	716	1782	51.8

[a] 80% of all abortions assumed to occur in 1st trimester and 20% in 2nd trimester.
[b] 10% of medical abortions in 1st trimester and 15% in 2nd trimester assumed to "fail" and were given prevailing mortality rates for unsafe abortion.
[c] Excluding Japan, Australia, and New Zealand.

available and used off-label for many obstetric/gynecologic conditions. Although not as effective as mifepristone–misoprostol, misoprostol-alone has been studied for first and second-trimester abortions [6,7].

Misoprostol abortion regimens of varying doses and routes of administration have been tested in developing regions [8–10]. Efficacy of misoprostol-alone for first-trimester abortion ranges from about 88–96%, but may be lower in legally restricted