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Potential for health economics to influence policies on tobacco use during pregnancy in low-income and middle-income countries: a qualitative case study

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ABSTRACT

Introduction Tobacco control during pregnancy is a policy priority in high-income countries (HICs) because of the significant health and inequality consequences. However, little evidence exists on interventions to reduce tobacco use in low-income and middle-income countries (LMICs), especially for pregnant women. This study aimed to assess how health economics evidence, which is mainly produced in HICs, could be adopted for tobacco cessation policies for pregnant women in LMICs.

Methods A qualitative case study was conducted in an international public health organisation. The organisation was chosen due to its capacity to influence health policies around the world. Tobacco control experts working in the organisation were identified through purposeful sampling and snowballing. Semistructured interviews were conducted with 18 informants with relevant experience of countries from all of the regions covered by the organisation. Data were analysed using the framework method.

Results In practice, tobacco cessation during pregnancy was not viewed as a priority in LMICs despite international recognition of the issue. In LMICs, factors including the recorded country-specific prevalence of tobacco use during pregnancy, availability of healthcare resources and the characteristics of potential interventions all affected the use of health economics evidence for policy making.

Conclusion The scale of tobacco use among pregnant women might be greater than reported in LMICs. Health economics evidence produced in HICs has the potential to inform health policies in LMICs around tobacco cessation interventions if the country-specific circumstances are addressed. Economic evaluations of cessation interventions integrated into antenatal care with a household perspective would be especially relevant in LMICs.

Strengths and limitations of this study

- This is the first evaluation of the potential use of health economics evidence in low-income and middle-income countries on tobacco cessation during pregnancy in high-income countries.
- The case study included informants working for an international public health organisation in different countries across six regions.
- There might be some additional considerations for specific countries that were not covered by the informants in this study.

INTRODUCTION

Tobacco use by pregnant women is a priority area in tobacco control due to the substantial health impacts for mothers and infants.[1–5] Policy documents indicate that it is an important public health issue in some low-income and middle-income countries (LMICs), and there is particular concern around the increase in tobacco use among young females.[6] Prevalence of smoking during pregnancy is high in some LMICs, for example, around 15% in Turkey, and in some countries where cigarette smoking prevalence is low, smokeless tobacco use by pregnant women is common, for example, 7% in India.[7 8] The relevance of both smoking and smokeless tobacco use in LMICs is to some extent mirrored in high-income countries (HICs) due to the recent rise in e-cigarette use.[8–10] Smoking during pregnancy is a health inequality issue in HICs because women from lower socioeconomic groups are more likely to smoke. However, little is known about the impact of socioeconomic deprivation on tobacco use during the pregnancy in LMICs.[8 11–15]

A range of interventions, including counselling, feedback and incentives, have been effective and cost-effective in HICs.[16–18] In many HICs, most interventions are delivered by specialists at cessation clinics within the context of strong national tobacco control policies and universal healthcare coverage. However, these elements do not exist in most

LMICs, and so their applicability to LMICs could potentially be limited.

Despite its significance in HICs, there is limited evidence on the effectiveness of tobacco cessation interventions during pregnancy in LMICs; a systematic review[16] identified only one study which involved four Latin American countries.[19] Moreover, no economic evaluation of such interventions in LMICs has been published, although approximately 22% of all economic evaluations in healthcare globally have been conducted in LMICs.[16 20 21] There is a lack of health economic evidence around tobacco cessation interventions during the pregnancy in LMICs, because these interventions are not common in LMICs and conducting economic evaluations is costly and challenging.[20 22] Therefore, decision-makers in LMICs frequently draw on evidence from HICs, as is the case for other public health issues. The existing guidelines on transferring health economic evidence across jurisdictions focus exclusively on HICs, and no study has been published on the use of HIC-based health economic evidence on tobacco cessation in LMICs.[23–26] Hence, the main objective of this study was to explore the potential for health economic evidence produced in HICs on tobacco cessation interventions during pregnancy, to influence health policies in LMICs. Identifying the characteristics of potentially cost-effective cessation interventions in LMICs was a second objective.

METHODS

Study design

This research was designed as a case study of an international public health organisation. As instructed by the ethics team at the international organisation, the name of the organisation and the associated ethics department have not been disclosed to prevent any potential conflict with the partners of the organisation. This information was shared with the editorial team that agreed to keep it confidential.

The organisation where this research was conducted is a leading global organisation that aims to influence health policies at the international and national levels by providing leadership and technical support. The organisation helps countries, mostly LMICs, implement tobacco control policies. A department within the organisation focuses on tobacco control policies and provides guidance to LMICs, working closely with experts based in regional or country offices. This organisation's experts consider available evidence including published studies and regional-specific and county-specific insight and requirements to inform health policies in LMICs, and so it provides a environment for the research question of this study.

Purposeful sampling and snowballing methods were used to identify all potential informants with expertise in smoking during pregnancy both in LMICs and HICs.[27] The director and the senior cessation specialist of the tobacco control department were approached as the 'key informants' and with their help, experts who were knowledgeable on the issue and had experience of working in LMICs were identified. No specific exclusion criteria were applied. Overall, 25 people including regional officers, public health experts, health economists, country officers and 'country focal points' were invited to be interviewed, and 18 agreed to participate. The 'country focal points' were experts working closely with the organisation and linked with national healthcare organisations, who were recommended by country officers. The World Bank's definition of LMICs was used.[28] In addition, Uruguay was included (although now officially a HIC) due to high levels of tobacco use during pregnancy (30% based on a meta-analysis of three studies published between 2007 and 2009).[7]

Data collection and analysis

The interviews were conducted face to face (n=9), via videocalls (n=6) and by phone (n=3), between June 2018 and March 2019. The interviews were semistructured to allow open discussion and gain comparable data.[29] An interpreter was employed during one interview because the interviewee did not speak English, following the recommendations for cross-language qualitative research.[30] Fifteen of the interviews were audiorecorded and subsequently transcribed in full, and notes

Table 1 Data analysis steps

Framework analysis steps	
Familiarisation	Main researcher (TSA) became familiar with the data through data collection, transcription and reading the transcripts. The other researchers (HM and LJ) read the transcripts thoroughly.
Identification of a thematic framework	TSA and HM independently coded the same transcripts and the themes were discussed by the research team (TSA, HM and LJ). The thematic framework was revised several times (TSA) accordingly.
Indexing	All transcripts were indexed manually, using the thematic framework (TSA).
Charting	Interview data were summarised on a matrix which was created by themes and informants (TSA).
Mapping and interpretation	Analysis was conducted by identifying the links between the codes and the research team discussed how to interpret the data in several meetings until agreement was established (TSA, HM and LJ).

Table 2 Roles and focus of the informants

	Role at the time of research	Region	No
Head office	Policy specialist	HICs and LMICs	I.1
	Health economist	South America	I.2
	Health economist	LMICs in general	I.3
	Health economist	LMICs in general	I.4
	Technical officer	Africa	I.5
	Technical officer	Africa	I.6
Regional offices	Regional officer	Middle East	I.7
	Regional officer	Pacific	I.8
	Regional officer	South Asia	I.9
	Previous regional officer	Africa	I.10
	Previous regional officer	South America	I.11
Country offices	Country officer	South America	I.12
	Country focal point	Europe	I.13
	Country officer	South Asia	I.14
	Country focal point	Pacific	I.15
	Country officer	Middle East	I.16
	Country focal point	Middle East	I.17
	Country officer	South America	I.18

HICs, high-income countries; LMICs, low-income and middle-income countries.

were taken during the other three interviews, in line with the interviewees' preferences. The Framework analysis[31] method was used because it has an applicable and systematic structure and provides flexibility in interpreting the data. The analysis was conducted using the steps shown in table 1.[31] Reliability and rigour were ensured through independent coding by two researchers (table 1).

RESULTS

Informants

The 18 informants were working in different roles during the data collection period (table 2) and had the experience of working in different parts of the world, enabling the research to cover a large geographical area. The cessation specialist was a key practitioner at the organisation, working closely with regional and country officers to support the establishment or improvement of cessation services. Two informants (I.5 and I.6) were specialists in maternal care with experience in tobacco cessation during the pregnancy.

Key themes

Four main themes were identified relating to interventions to reduce tobacco use in pregnancy in LMIC settings and the potential of health economics evidence to influence policy.

Theme 1: the policy context for tobacco use during pregnancy in LMICs

Characteristics of tobacco use during pregnancy

Context-specific characteristics of tobacco use during pregnancy have implications for intervention design and the potential application of HIC-based health economics evidence in LMICs. These include the reported prevalence of smoking and smokeless tobacco use during pregnancy and the impact on health inequalities.

Pregnant women in LMICs consume a range of tobacco products in addition to cigarette smoking which is common in countries like Uruguay (I.12, I.18). First, some women chew tobacco as they believe it helps to relieve morning sickness (I.8). Second, tobacco products are widely available; for example, in one Middle East country, smoking prevalence is reported to be low among women but traditionally every household has water pipes (shisha) and women tend to use them (I.17). Additionally, smokeless tobacco products are more affordable than cigarettes in some LIMC settings (I.9 and I.17):

> … for my region [South Asia] it is always tobacco cessation not just smoking cessation because many women do not smoke but they chew tobacco due to being unable to afford cigarettes (I.9).

Additionally, the accuracy of data on tobacco use by women in LMICs was doubted (I.10 and I.16). The cultural unacceptability of female smoking in most LMICs means that women are less likely to admit to tobacco use and reported prevalence rates may be higher than the actual figure:

> …when the question is asked there is usually someone within the household who is present. So for them to tell you the exact status of their tobacco use may actually be coloured by the presence of the spouse or the children or parents or anyone else in the household (I.10).

Under-reporting of tobacco use was viewed as affecting its perceived relationship with health inequalities during pregnancy. When asked about studies which found smoking more common among the socially advantaged women in some LMICs, the cultural acceptance of smoking in different socioeconomic groups was raised:

> … with increasing income the person moves into a higher socio-economic standard where it becomes more acceptable to announce that you smoke, you drink, that you live on your own (P. 16).

Prioritisation of reducing tobacco use during pregnancy

According to the interviewees, in practice, pregnant women are not a priority group for addressing tobacco use in most LMICs (I.1, I.7, I.9 and I.16). Political will to reduce tobacco consumption and the dominance of policy measures, such as smoking bans, over cessation interventions were seen as the key issues affecting prioritisation of reducing tobacco use during pregnancy:

> Countries are doing their minimum for cessation services (I.7).

In countries where smoking by women is culturally unacceptable, the scale of the problem and the importance of providing support for women who use tobacco during the pregnancy may not be fully appreciated (I.5 and I.10). This may cause limited or no interest in the issue by policymakers:

> The political infrastructure doesn't like these facts pointed at: that women are smoking, women are drinking alcohol, that they want services for tobacco cessation (I.10).

Additionally, policy-makers may not be convinced that cessation interventions are effective compared with policy measures. At all levels there was more emphasis on policy measures than cessation interventions, in part because major donors in LMICs have tended to focus on policy measures (I.1, I.2, I.3 and I.15). Therefore, several informants reported that although smoking is considered an important public health issue, and there is concern to reduce tobacco consumption in some countries, policy control measures are often preferred to cessation services, and hence services are not available for those women who wish to quit:

> *The donors do not want to invest in this* [cessation]. *People want to quit but we do not provide help for them. Where can they go? (I.15).*
>
> *Tobacco control* [policy measures] *is thought to be the most efficient and cost-effective way but I disagree. They do not want to invest in cessation policies because they seem to be costly and the result is not as clear according to them (I.1).*

Theme 2: the features of local healthcare systems

Healthcare resources

All interviewees stressed that overall access to healthcare resources is very limited in LMICs, which means that resources to support women to reduce tobacco use are necessarily constrained; this includes the availability of specialist cessation services, provision of support in mainstream healthcare services, and a lack of trained healthcare professionals (HCPs):

> In my region, many countries do not have any kind of cessation service, anything available. I would say only 10%–15% would be able to access these kinds of services (I.9).

Although tobacco policies and cessation services are available in some settings, access can be a problem; for example, in many countries people have to pay for them out of pocket (I.8, I.9 and I.14). In the Middle East, however, 'ask & advice' has been integrated with publicly funded primary care in most countries except for Somalia and Sudan. In countries where such services are mostly publicly funded, it was suggested that health economics evidence from HICs with similar funding sources would be more relevant for policymakers.

Prioritising funding for a cessation intervention which solely focuses on pregnant tobacco users is challenging, not just due to concerns about prevalence but also because of the perceived lack of short-term tangible benefits compared with, for example, interventions for tuberculosis or HIV. Another issue is the lack of HCPs specially trained in smoking cessation: '*the majority of the healthcare providers are not trained or they are not confident to talk about this.*' (I.1). Thus, depending on the nature of the intervention, additional costs would arise from the need to specifically train HCPs.

Other factors

An absence of mechanisms to reward HCPs for addressing a potentially sensitive and difficult topic could be a challenge for implementation. For example, in many HICs, HCPs are encouraged and incentivised for providing cessation support to patients. Hence, even if economic evidence indicates that some interventions are potentially cost-effective, the lack of broader reward mechanisms, such as performance assessment, to encourage HCPs to provide the service may be an issue in LMICs.

Additionally, effectively engaging pregnant women could be challenging in some countries. For instance, many women in rural South Asia only speak their local language, which means that information materials would need to be prepared in local languages and translators would be required for counselling (I.14). Similarly, to provide such interventions, HCPs might need to travel in scarcely-populated areas, which would increase costs.

A related problem is the fragmented healthcare system in some countries. Pregnant women may not be under the care of a specific healthcare provider during their pregnancy and they may access care in different ways (I.12). Hence, effective continuity of care and funding could be challenging in those settings (I.6 and I.9).

Theme 3: identifying the characteristics of potentially relevant interventions

Given the resource constraints and wider socio-cultural factors in LMICs, most informants emphasised the importance of focusing on existing services and clinical resources by integrating cessation services into existing antenatal care. In addition, due to cultural norms, women would be more able to access support in such settings:

> If it is integrated into maternal and child health services for example this would be very simple because then someone walks in with their child, and they are

able to access tobacco cessation as well, this will be good. But if it is a stand-alone, the way we are doing it now, we find that it is more difficult for women to be able to access it than for men (I.10).

The long-term effectiveness of this approach would also potentially be enhanced, as support could be integrated into routine follow-up visits.

One of the most repeated features was the need for interventions to have a household perspective, which could be identified as '*cocoon cessation*' (I.6) or '*killing two birds with one stone*' (I.8). Partner involvement was not only seen as important for providing additional support for the women themselves, but also potentially for reaching smoking men and reducing secondhand smoke exposure (I.9). Furthermore, designing an intervention which includes other family members increases the target population, which is important due to the high rates of tobacco use among males in LMICs.

Another suggestion was that interventions should promote community support, since interventions developed in harmony with the existing culture were believed more likely to be effective (I.5, I.8 and I.10). For example, in some settings village elders could potentially be influential and their advocacy could reduce the cost of a cessation intervention since fewer people from each village would need to be reached by HCPs:

> … another kind of cultural aspect that elders you know giving advice to younger people. One potential we have is to build on that and … ask those people to the champions or to be the message bearers (I.8).

The informants noted that financial incentives for pregnant smokers, which have been promising in HIC interventions, would be unaffordable in most LMICs:

> We don't have enough resources to provide financial incentives especially in the long-term although they work (I.6).

Theme 4: the use of economic evidence in LMICs

The informants highlighted some important components of decision-making in relation to investments in tobacco cessation interventions for pregnant women. Most informants felt that economic evidence was important in informing governments about which interventions and services should be funded:

> I mean how can you convince a government? If you cannot prove that the effect relative to the cost would be higher (I.3).

One informant (I.2) added that public health and non-governmental organisations used economic evidence to try to influence policy making. However, according to the informants, politicians would not necessarily rely on cost-effectiveness evidence to make decisions, even if available, as the wider policy environment would also be relevant (I.10, I.13, I.18):

> It depends on government's commitment to tobacco control. Those highly committed, probably, would value and consider cost-effectiveness studies on smoking cessation. Others probably don't (I.2).

Overall, the potential for HIC-based health economic evidence to influence policy is often constrained by a lack of relevance due to the characteristics of HIC interventions. This may include focusing on specialist services separate from antenatal healthcare provision, or providing direct financial incentives for smokers, as they entail resources unavailable typically in LMICs. Nevertheless, the interviews provided evidence on the potential value of the economic evaluation of LMIC-specific interventions, which could inform consideration of the merits of cessation interventions in comparison to other policy measures.

DISCUSSION

This is the first study to explore the use of health economic evidence on tobacco cessation interventions during pregnancy for policy making in LMICs. The main finding is that health economic studies addressing context-specific challenges could be useful to close the gap between the policy rhetoric and practice in prioritising tobacco cessation interventions for expectant mothers. This depends on the design of both the intervention and the evaluation. For example, in countries where tobacco use by women is not culturally acceptable, a stand-alone cessation clinic would not be accessible by women due to their concerns over privacy. Intervention affordability is a key consideration, and services which require less investment and are integrated into existing services would be more appropriate in LMICs. Nevertheless, perceptions about the low prevalence of tobacco use during pregnancy, cultural structures and wider policy issues around policy measures versus cessation interventions could inhibit the influence of such evidence in some countries. Therefore, there are applicability issues to be considered in addition to those relating to technical transferability, which include using jurisdiction-specific unit costs.[24]

This study has some limitations. First, the study reflects the views of 18 individuals working in a large international organisation. Although the informants provided representation of all the regions covered by the international public health organisation's, there might be some additional considerations for specific countries that were not covered by the informants in this study. Another consideration is that at the time of the interviews, some of the participants were not working in the specific region for which they provided information. Hence, there may have been some recent changes that have not been reflected in this study. Policy-makers and researchers will have to consider country-specific issues when planning intervention development and evaluation. Nevertheless, the interviewees raised a wide range of issues which provide

insights into the range of considerations surrounding the use of economic evidence in this area of public health.

Additionally, the interview format varied, and in one interview an interpreter, a senior health economist, was required. However, the informants were comfortable with the forms of communication used due to the nature of their jobs, and a rigorous process was followed with the interpreter to ensure the impact on the data was limited. Although three of the interviews were recorded via note-taking instead of a transcript, the informants were happy to be contacted again if there had been any queries, and hence the impact on the data was limited.

This study explored some important issues which have been indicated in the wider literature. For example, in the study by Drummond *et al* the main challenge discussed in relation to the transfer of health economic evidence to middle-income countries was different practice patterns and the availability of facilities.[23] Similarly, a recent review of economic evaluations conducted for priority-setting in LMICs highlighted that not considering the features of a specific healthcare system might inhibit the use of health economic evidence in policy making.[30] Similar challenges were discerned in a review of economic evaluations of non-communicable diseases in LMICs.[16 19 32] The current study provides more specific details on the issue in the context of tobacco cessation interventions aimed at pregnant women, and highlights the importance of considering sociocultural factors.

The study generates a hypothesis that the most relevant cessation interventions for pregnant women in LMICs would be those that are integrated into antenatal care and incorporate a household perspective. The findings support the idea of recognising pregnancy as a window of opportunity to reach all members of the household. The existing evidence shows that psychosocial interventions such as financial incentives and social support are effective and cost-effective in HICs while there is a lack of evidence in LMICs.[16] One study published in 1995 reported that low-intensity and short-term home-based education was not effective in helping pregnant women quit smoking in Latin America.[19] Hence, more research on the effectiveness of such interventions in LMICs is needed.

Considering the wide variation in provision and quality of antenatal care in LMICs,[33] important suggestions included taking advantage of cultural characteristics (eg, the extended family structure in Africa) to support pregnant women throughout pregnancy and using existing social community structures (eg, women's groups) to reach pregnant smokers. These findings are supported by WHO Framework Convention on Tobacco Control which recommends that tobacco cessation strategies should consider factors such as educational background, culture, affordability[34] and adopting a household approach.[6]

Although not mentioned in these interviews, other research has suggested that some of the underlying factors, which may contribute to the challenges of improving antenatal care, is a lack of attention to women's empowerment, which is a key determinant of healthcare access and utilisation.[35–37] Another important factor is the challenge of providing adequate antenatal care to all women in all countries, with integrated tobacco cessation support . This is hindered by the differences in healthcare systems and country-specific reasons, such as lack of resources.

The study has important implications for the design of economic evaluations in relation to their applicability in LMIC settings. Economic evaluations that are adaptable to the political, economic and cultural context of a particular setting would be more relevant. In parallel with this, the current study has identified the characteristics of economic evaluations of tobacco cessation interventions aimed at pregnant women which would enhance their impact on tobacco control policies in LMICs. To be relevant in LMIC contexts, economic evaluation of cessation interventions for pregnant women should include different forms of tobacco use rather than just cigarette smoking. The findings indicate that interventions may not be given attention in countries where a policy focus on tobacco is lacking. Furthermore, in many countries, policy measures are preferred to cessation services. It may be that economic evaluations of cessation interventions, if found to be highly cost-effective, may help to raise the profile of policy in this area and subsequent implementation.

CONCLUSION

The scale of tobacco use among pregnant women is likely to be greater than reported in LMICs. Health economics evidence has the potential to influence health policies in LMICs. However, a range of factors that inhibit the applicability of current HIC-based evidence needs to be addressed. Since LIMCs have their own social, political and economic dynamics, economic evaluations should be adaptable to specific contexts to enhance their impact on health policies. Economic evaluations of cessation interventions integrated into antenatal care with a household perspective would be potentially relevant in LMICs.

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Contributors This work was part of the main author's (TSA) Ph.D. work and TSA is responsible for the overall contet as the guarantor. All the authors contributed to the design, planning and analysis stages while data collection was done by the main author. The main author developed the study protocol, undertook the interviews, and wrote the manuscript with supervision from the co-authors. Coding of the interviews was done by TSA and HM, and the data were interpreted by the research team (TSA, HM and LJ).

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