

Risk Perception and Communication in Sub-Saharan Africa

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Abstract

In this narrative review, a brief summary of theoretical approaches to risk perception is followed by an analysis of some of the special factors influencing risk perception and risk communication in sub-Saharan Africa. Examples of recent and emergent local medicines and vaccine controversies in several countries are given along with evidence and analysis of how they were managed. These demonstrate, among other things, the extent to which ethnic, religious and cultural issues influence popular perception, and the power of rumour and anecdote in shaping public opinion and official responses to events.

Where safety monitoring systems exist, they are in their infancy, with limited capacity for data collection, credible scientific review, effective public communication and robust crisis management. Although increasing democratic freedoms, including less restricted media, and evolving health systems are addressing the challenges and give hope for further progress, there are still deep and intractable issues that inhibit transparent and effective risk communication and stand in the way of African populations comprehending medicines and their risks in safer and more balanced ways.

Some proposals for future change and action are offered, including the pursuit of a deeper understanding of local and national values, assumptions and beliefs that drive risk perception; tailoring public health planning and

communications to specifically-targeted regions and populations; strengthening of safety surveillance and data-collection systems; giving higher priority to medicines safety issues in healthcare training and public education.

Few people in the world are rational and consistent in their response to risk; even the conviction of those who believe they are is no guarantee that their personal management of risk will show much exercise of reason. 'It won't happen to me,' is the self-deluding mantra mouthed even as the mobile phone is answered by a rational, educated person at the wheel of a moving car or motorbike and the true risk of an accident multiplies significantly.¹ The risks of smoking, obesity and excess alcohol intake are well known, and perception of them has had variable effects on behaviour. In the case of smoking, it has taken decades of communication and campaigning to reduce tobacco use in some parts of the world, while the oft-communicated threat of multiple health problems from unhealthy eating has yet to have much impact and threatens an epidemic of non-communicable diseases.

People are willing to take large voluntary risks (including drink-driving and extreme sports, for example), but they are highly intolerant of risks over which they feel they have little control (medicines, vaccines and environmental hazards, for example), however low the estimate or questionable the evidence. Quite different criteria of judgement are applied in these two spheres, with a wide spectrum of secondary differences within them.

1. Chronology of Approaches to Understanding Risk Perception

Social scientists have long struggled to understand the factors influencing perception of risk, prompted, in the 1960s, by the observation of the wide discrepancy between lay and expert responses to the risks of new technologies and natural ha-

zards. Early approaches such as Starr,^[2] now largely discredited, assumed that people behaved in a rational manner, modifying their opinions, for example, in response to additional information or data. The psychological approach (such as Slovic et al.^[3]) took a psychometric perspective, looking at heuristics² and biases, and identified a range of factors that influence how people assess risk (degree of dread, knowledge and familiarity, risk-benefit trade-offs, degree of choice or imposition, and many more).

The Social Amplification of Risk Framework^[4] embraced a much more sophisticated approach combining psychology, sociology, anthropology and communications theory. This theory attempts to explain how perception of risk is amplified or attenuated through the multiple filters (culture, politics, psychology, media) active on the journey of any piece of information or opinion from its source to its dispersed audiences.

The combination of these two last approaches (specific variables and larger sociological influences) provide a productive basis on which to discuss risk perception and, consequently, what kind of communication is required to address the large and seemingly intractable problems, especially in healthcare. They also provide useful tools for characterizing the immense variability not only across cultures, but within them and across their internal demographics.^[1]

2. Information, Culture and Trust

Risk communication by experts and policy makers has tended to patronize, downplay or ignore the concerns and interests of the population; this has led to public scepticism and distrust of tech-

1 This 'optimistic bias' – the belief that one is less at risk than others – is one of a range of factors determining an individual's perception of risk; this bias seems to have greater universality than others which tend to be more influenced by culture (see Ted et al.^[1]).

2 Heuristics: the solving of problems based on past experience.

nocrats and officials.^[5,6] The importance of clear communication to the public of what is known about risks and uncertainties, regardless of the irrationality of public concern, is one of the cardinal principles underlying good governance and effective risk communication,^[7] but is far from sufficient to manage public perception and feeling in all their diversity and complexity. Concerns regarding the safety of the measles, mumps and rubella (MMR)^[8] vaccine in several countries and the pertussis vaccine in the US,^[9] resulted in consequential low uptake of immunization and later emergence of previously eradicated diseases. This shows the high price paid by society if risk communication does not take into account and address intricate and demanding public concerns, however trivial or misguided they may seem to experts.

MMR scares and consequences: It was, of course, a fraudulent scientific paper in a distinguished medical journal^[10] that sparked the perception of the triple vaccination as a serious risk to children. This perception was inflamed by a number of factors, including *dread* of damaging children, the *imposed* nature of the risk, the *irreversibility* of effects, *mistrust* of science and government, and powerful *anecdotes* of alleged harm, amongst many other influences. The tensions were amplified by strident *media attention*, by *active and eloquent parents* and by the anti-immunization lobbies who quickly appropriated the cause as their own and hyped-up their emotional *propaganda*. That the paper was demonstrated to be fraudulent and its findings absolutely disproved by a number of distinguished researchers, did not remove residual doubts that continue to reverberate damagingly today.

3. The Impossible Task

Risk communication is faced with the implacable fact that demonstrating beyond doubt that there is no risk is an impossibility, because there can never be no doubt that there is no risk in the future, whatever the evidence of the past may suggest (the assertion that 'we shall ensure this

never happens again,' is not only a hostage to fortune, but a blatant deceit). The energetic conclusions of methodical and conscientious scientists^[11] and the formal withdrawal of the fraudulent MMR paper by the journal^[12] could do nothing to eliminate the seed of doubt that had been planted and flourished as a fully grown and passionate conviction in many countries.

Such powerful events as (until recently unheard of) outbreaks of measles and whooping cough and the deaths of children^[13] did little to modify the certainty among some sectors that MMR and pertussis vaccine were grave threats to their own children.

These cases distil the unique challenges of risk communication in any society, developed, sophisticated, mature, educated or not. It highlights the extent to which information and data are largely secondary, even superfluous, in a world where opinions and decisions are determined by feelings, values and idiosyncratic heuristics. In this respect, developed countries are no different from any others.

4. Risk, Communication and Individual Patients

The risk communication issues evident in public health capture headlines and fuel controversy, but there is probably a much more radical problem at the level of individual patients taking traditional and modern medicines for less high-profile purposes. The amount and quality of risk communication given to patients at the point of diagnosis, prescription and dispensing, or at the point of purchase, are issues of concern across the world. In Africa, and other developing countries, the problems are much greater. This is not only because of the universal failure of good risk communication training in professional education and traditional practice, but because of the pressure of numbers, poverty, access, remoteness, public ignorance, the almost universal availability of medicines of all kinds on the streets from unauthorized vendors, and largely non-existent patient records and follow-up.

Pharmacists or the often poorly qualified or unqualified staff of non-pharmacist-owned businesses see themselves as sellers of pills, pursuing

profit; they are working largely at the behest of customers, whose maybe irrational demands (for antibiotics, for example) can hardly be resisted. Patient counselling or support for adherence to demanding regimens (anti-tuberculosis [TB] medication, for example) are rare.^[14]

5. Cultural and Religious Influences

While Western populations may certainly be said to lack in-depth knowledge and understanding of science and medicine,^[15,16] African countries have a much shorter history of familiarity with allopathic treatment and, consequently, even less grasp of the principles and mechanisms. For the great majority, traditional African remedies, both material and spiritual, provide a more familiar and credible approach to disease.^[17] Such faith brings with it all kinds of complicating factors in relation to scientific medicine, not least in concepts of cause and effect.

In Africa, important aspects of the universal irrationality of beliefs and risk perception differ significantly from the West. There are, for example, major ethnic, religious, cultural and superstitious influences in how issues are assessed and decisions made. A number of disastrous problems have emerged in relation to vaccination, in northern Nigeria; for example, Kapp^[18] where there was a belief that the immunization of children against polio was actually an anti-Muslim plot to damage future generations^[19] (this is echoed by the 2012 ban on polio vaccination in Pakistan by the Taliban^[20]). The Ghana de-worming scare^[21] was accompanied by an upsurge of vitriolic allegations about the intentions of the authorities to damage ethnic groups under the guise of public health.

The former of these was eventually resolved after immense efforts of persuasion, international evidence collection and negotiation, but only after new cases of polio emerged and wild polio virus spread through the region.^[22] Residual resistance and parental refusal remain, however.^[23] In Ghana, the immediate emergency was defused by rapid and insistent action and communication, but the underlying suspicions and vitriol were almost certainly left intact.^[21] In both cases, great damage was done to the cause of public health

and to the credibility of the authorities for reasons quite outside the usual, limited perspective of bureaucrats and officials. Risk in healthcare has roots far beyond the medicine and the patient, way out into society, culture, superstition and much else.

6. The Impact of Distant Influences

Africans have long been subject to the imposition of Western systems and solutions, and to the presumptuousness that often underlies ostensibly benign initiatives.^[24] This gives rise to insidious doubts about the integrity of foreign-initiated development plans or resources; the behaviour of foreign organizations can sometimes seriously exacerbate the problems. Lapdap[®] (chlorproguanil + dapsone) [eventually abandoned] was an example – an antimalarial drug approved by the UK Medicines and Healthcare products Regulatory Agency for an indication not common in the country of approval, and for a remote population with prevalence of a significant genetic variation (G6PD deficiency) which made them vulnerable to potentially serious adverse effects.^[25]

Western regulatory authorities give little thought to the impact of their decisions – withdrawal of a drug from the market, for example – on countries with immature regulation, utterly different problems and priorities, and media who are only too ready to look abroad (to the people assumed to ‘know what they’re doing’) and ask why authorities in their country are not following suit.^[26-29]

The recent (July 2011) full registration via the regular route of an antimalarial, Eurartesim[®] (dihydroartemisinin-piperaquine), by the European Medicines Agency (EMA) for use worldwide, including in the EU,^[30] indicates that lessons have been learnt from the Lapdap[®] experience. The subsequent (February 2012) positive scientific opinion given by the EMA on another antimalarial, Pyramax[®] (pyronaridine + artesunate), but with the statement in the assessment report (EMA/CHMP/61768/2012) that “Pyramax[®] will be intended exclusively for markets outside the Community”^[31] presents an interesting scenario and case study on the approaches taken by a stringent regulatory authority in dealing with products for a disease not endemic in its region

but of huge global public health importance. The producers of Pyramax[®] did not seek marketing authorization in the EU – only a positive scientific opinion under Article 58³ of the EMA regulations. This enables the product to be seen as assessed by a credible regulatory authority and hence facilitate pre-qualification by the WHO. Pre-qualification by WHO indicates that the product meets stringent criteria for safety, quality and efficacy and can thus be procured using funds from most, if not all, donors. Since the granting of a positive scientific opinion by the EMA follows the same rigour as that for granting marketing authorization in the EMA, regulators and policy makers in Africa view the positive scientific opinion from the EMA as the granting of marketing authorization. They are thus left wondering why, in view of the granting of marketing authorization, the product is ‘exclusively for markets outside the EU’. For instance, policy makers, regulators and the general public in malaria-endemic countries are likely to have the perception that Eurartesim[®] is safer than Pyramax[®] since the former is available for use in the EU whilst the latter is labelled not for use in the EU. Is it because Eurartesim[®] is safer than Pyramax[®] or is it because the approval process for Pyramax[®] did not allow EMA officials to be in a position to make pronouncements on its safety in relation to Europeans? Are there different (higher) standards for medicines intended for use in the EU as against those to be used in African countries and other malaria-endemic countries? These questions and those relating to the processes used for registering the two antimalarials need simple answers. However, it is doubtful if explanations relating to Article 58 of the EMA collaboration with WHO for scientific opinions on medicines are likely to convince any non-expert, let alone lay persons or conspiracy theorists. This is a clear example of the communication and risk perception challenges that confront even well intentioned initiatives.

7. Risk Communication Challenges in Africa

The primary challenges of risk communication in Africa and other developing countries are no less immense than elsewhere: developing risk assessment processes and reliable data-collection systems;^[32] trying to push evidence and information up the agenda; persuading people that the benefit-harm trade-offs of certain courses of action need to be courageously addressed for the benefit of individuals and society; establishing the trustworthiness of governments and health systems and the integrity of local scientists; accustoming people to acceptance of uncertainty as an inevitable element of medicine and life itself. But there are other issues too: the influence of tribal, religious and community leaders and their impact on local opinion; the faith in traditional remedies and unscientific beliefs about therapy and benefit (medicine that makes you vomit is, *ipso facto*, strong and effective); the degree of fatalism or other worldly determinism in life's opportunities and possibilities; and, on a much more urgent and immediate basis, the simple but crushing pressures of survival in hostile and unforgiving environments. The absence of established governance régimes, democratic practices, robust surveillance and other systems, transparency in most aspects of life and a genuinely free press combine to make issues of communicating risk in healthcare extremely complicated, challenging and sometimes hazardous.

One is inclined to ask: how can such issues ever be addressed and are there lessons that can be learnt? The following review focuses on key incidents in Africa over the past few years and how they influence risk perception and communication. The broad principles and viewpoints, with a few exceptions, relate to nearly all the countries in sub-Saharan Africa and probably other developing countries.

3 Article 58 of Regulation (EC) No 726/2004 allows the EMA to give opinions, in co-operation with the WHO, on medicinal products for human use that are intended exclusively for markets outside of the EU. Medicines eligible for this procedure are used to prevent or treat diseases of major public health interest, including vaccines used in the WHO Expanded Programme on Immunization as well as medicines for WHO target diseases such as HIV/AIDS, malaria or tuberculosis.

8. Risk Perception and Communication in New Democratic Environments

The general shift from autocracy and dictatorship towards democracy and openness in African countries has been accompanied by the gradual establishment of stronger national systems and institutions in healthcare and other areas. All across Africa, national expanded programmes on immunization for childhood illnesses; national disease control programmes for malaria, HIV/AIDS, tuberculosis; and national essential medicines lists and formularies, to name but a few, have been established or created providing an environment that permits questioning of decision making and critique of outcomes.

The general liberation of the mass media, reduction in censorship and improvements in freedom of speech have also provided channels for airing concerns and demonstrating dissent. Citizens all over the world no longer suffer in silence but rather complain loudly, sometimes for very good reasons.^[33-35] Nevertheless, African systems and bureaucracies are often far from being the most efficient and transparent.^[36,37] There are still too many vested interests in senior positions and too little genuine scientific objectivity in much decision making and public communication.^[38,39] (It might be reasonably observed that this is not so different from the situation in some advanced nations too.)

A graphic example of the power of public outrage was the outcry that accompanied the introduction of amodiaquine+artesunate as the first-line treatment for uncomplicated malaria in Ghana in 2005 (see Dodoo et al.^[40]). Whilst the national authorities, without any scientifically rigorous evidence, assured citizens that the combination was safe, local print and electronic media repeatedly carried stories of patients being harmed by the combination. The mounting resistance against the drug combination reached a crescendo in December 2005 following the reported death of two patients due to the drug, causing the government to withdraw implicated brands of the product and put in place measures, including alternatives.

These media-reported deaths were never confirmed and it was impossible to assess if there was

any association with intake of amodiaquine+artesunate. Nonetheless, the banning of specified brands of the combination went ahead, due largely to the sheer number of patients complaining of adverse events in the media and to the National Pharmacovigilance Centre. The banned brands were co-blistered formulations containing 300 or 600 mg amodiaquine and 100 or 200 mg artesunate, or single tablets containing a combination of 300 mg amodiaquine+100 mg artesunate or 600 mg amodiaquine+200 mg artesunate. These deviate from the WHO specification for the combination, which suggested loose or co-blistered amodiaquine 150 mg (153 mg) tablets and artesunate 50 mg tablets. The absence of enough samples of the banned products prevented adequate analysis of their quality and the ban remains in place despite the absence of evidence that the different formulations were responsible for the adverse events.

The main reported adverse events associated with the amodiaquine-artesunate combination were generalized weakness and movement disorders. It is interesting to note that 'movement disorders' (specifically dystonia) have now been acknowledged as an adverse reaction to amodiaquine+artesunate.^[41] This association is accepted as the first drug safety signal to come out from Africa from data obtained entirely from national spontaneous reporting systems in Africa. The fact that the ADR reports that led to the signal originated from rumours and airing of perceptions makes it important for policy makers and health professionals to pay attention to all hints, rumours and communications of drug safety issues in their environment, regardless of whether they consider them to be from reliable sources, rational, plausible or not.

The link between a democracy, a liberated media and an ability to dissent on public health issues was demonstrated recently in Malawi. Following an unexpected régime change and a return to freer and more open media in 2012, Malawians were able to voice concerns on a national mass drug administration campaign designed to protect against schistosomiasis. Media reports of deaths and adverse effects attributed to the 'schistosomiasis vaccination' caused the Ministry of Health to suspend the activity.^[42] The fact that the mass drug administration was not 'vaccination' and

also that several of the allegedly affected children were said to only have had mild hysteria, did not prevent the Ministry of Health from halting the programme for 'logistical reasons'.^[42] This action was undertaken notwithstanding the fact that doctors treating children from the affected areas reported only a handful of incidents. The absence of a National Pharmacovigilance Centre in Malawi and the lack of explanation from the Ministry on the basis for its actions raise the question as to

whether the Ministry's priority was purely to placate a vocal and angry public without regard to the public health imperatives that drove the initial decision to run the programme. We must surmise that the authorities did not feel that any methods of communication available to them could diffuse the controversy and that public relations and politics drove their thinking and action.

Table I shows public health incidents arising from risks and their perception by the public and

Table I. Risk perception in Africa: issues, actions and responses^[18,21,40,42-44]

Country/issue	Action and response
Nigeria: Polio crisis arising out of concerns in northern Nigeria that the polio vaccine was intended to harm Muslim baby boys (see section 5)	Huge global effort and advocacy culminating in key religious figures agreeing that polio immunization can continue but only on the condition that the vaccine is sourced from a Muslim country. Polio virus from Nigeria spread to nearby countries. As with the Ghana de-worming crisis, research into antecedent local conditions had not taken place and no measures were in place to manage popular feeling and belief. <i>Crisis driven by deep religious/ethnic distrust of authorities; science and PR-based solution</i>
Ghana: De-worming crisis when mass administration of a single dose of 500 mg mebendazole chewable tablets to all school-going children was reported to have caused deaths and serious adverse reactions (see section 5)	No drug-associated deaths were noted and no serious adverse reactions were recorded. However, the rollout of the deworming exercise took place without adequate prior consultation or education of parents and the community. Mass school-based de-worming exercises did not occur the following year and the programme is now much better managed. <i>Rumour-driven crisis; intermediate placatory and explanatory solution; long-term management and communications improvements</i>
Ghana: Outcry against amodiaquine + artesunate as a result of safety concerns – generalized weakness, movement disorders (see section 8)	Withdrawal of implicated brands of amodiaquine + artesunate from the market Revision of national malaria policy to include two more artemisinin-combination therapies – artemether + lumefantrine and dihydroartemisinin + piperazine <i>Rumour-driven crisis; PR-driven outcome</i>
Malawi: Reported death and adverse events associated with the administration of albendazole and praziquantel for the control of schistosomiasis in southern Malawi (see section 8)	Media reports and public concern caused Ministry of Health to 'indefinitely suspend' the mass drug administration campaign for 'logistical reasons' without explaining what the reasons were. <i>Rumour-based crisis and irrational, PR-based outcome</i>
Ghana: Complaints of adverse events following vaccination with the H1N1 vaccine.	Media outcry and a request for government to explain the basis for the mass H1N1 vaccination since it was initially restricted to fans travelling to South Africa for the 2010 football world cup. It was later extended to selected urban areas without any explanation for choice of areas and reasons for involving the whole population. The programme was quickly halted and no further mass immunization against H1N1 was undertaken <i>Public outrage driven by poor official communication and explanation; PR-driven outcome</i>
Nigeria: 'My Pikin' teething mixture contained diethylene glycol instead of propylene glycol. Over 100 children dead	Rapid and open action by national authorities including obtaining assistance from the US Centres for Disease Control and Prevention towards identifying the cause of the renal failures and death. Constant open communication with the public; identification of the product and company involved and legal action including prosecution. Actions of Nigerian regulators seen as successful in dealing rapidly and effectively with the issue and reassuring the population <i>Rational, scientific management and outcome</i>
<i>Commentary on incidents:</i> With the exception of the 'My Pikin' event, which shows a simple incident-investigation-resolution chain, the events outlined all demonstrate the enormous extent to which popular opinion and official decision-making are driven by perceptions and concerns other than strictly scientific ones. Rumour and media-reported anecdotes inflame populations that have been inadequately briefed and consulted and who instinctively distrust the authorities; officials lack the authority, confidence and skills to manage public outrage in the service of science and public health. Decisions often appear to show risk aversion in public relations management rather than risk aversion in public health management. Such actions can do nothing to prepare the ground for a more positive social environment for future programmes. Clearly, there is a long way to go.	
PR = public relations.	

how governmental agencies responded, including examples referred to in section 5.

9. Risk Perception and Communication in an Era of Increasing Global Health Initiatives

The last decade has seen a huge inflow of financial and technical resources to tackle diseases prevalent in poor countries, including The Global Fund Against AIDS, Tuberculosis and Malaria (Global Fund), the Bill and Melinda Gates Foundation, UNITAID, Medicines for Malaria Venture and Drugs for Neglected Diseases Initiative. These are just a few of the organizations that have worked to bridge the financial barrier to access for medicines to treat or manage HIV/AIDS, tuberculosis, malaria, schistosomiasis and leishmaniasis, among others.

The funds raised from these organizations have hugely expanded access to key medicines. Whilst no medicine is absolutely free from risk, the fact is that there is still relatively little drug safety monitoring activity associated with most of these programmes.^[45,46] This is a weakness that needs addressing in order to prevent crisis and to avoid the ethical, reputational, fiduciary and/or epidemiological risks that are certain to arise if rapid expansion of access to medicines is not accompanied by an equally widespread promotion of systems for monitoring their safety. (Currently, most funding applications do require specification of the systems to be put in place for safety monitoring.)

So far, with only few exceptions relating to antimalarials, there have not been any major complaints or troubles arising from these initiatives. This may be due to the fact that issues of financial, geographical and professional access remain priorities – with less than half of patients who need treatment for HIV/AIDS receiving it, making a fuss about issues of safety might sound unconvincing or even frivolous: after all what is the point in calling for safety monitoring when patients do not have any medicines?^[47,48] However, access to medicines for HIV/AIDS, TB and malaria is gradually increasing and with improving access will come increased public concern, general

scrutiny of products and serious monitoring, as strongly recommended by the WHO.^[49]

The recent change in WHO highly active antiretroviral therapy policy replacing stavudine with tenofovir^[50] due to safety concerns is a case in point. Whilst stavudine causes serious lactic acidosis,^[51,52] tenofovir is also known to be associated with renal impairment and failure.^[53] Communicating the supposed benefits of tenofovir (despite its effect on renal function) in place of stavudine is challenging, but it appears national programmes, physicians and patients have adapted. However, increasing calls for renal function monitoring for patients on tenofovir indicates increased ground-level vigilance and a departure from passive acceptance of official treatment policies, including recommendations from the WHO. The transformation of patients from passive recipients to active partners is a critical element in the evolution of more effective risk communication and in the mature management of risk in Africa and everywhere in the world.

10. Risk Perception and Communication and Health Workers

One area of risk perception and communication in Africa that deserves urgent attention and immediate remedy is the attitude of health workers towards patients and clients. Studies in advanced countries have shown how important it is for health workers, policy makers and technocrats in general to appreciate the perceptions, concerns and anxieties of patients and lay people (to exercise genuine empathy with them) in order to be able to undertake risk communication and provide healthcare effectively.^[54-57]

Insufficient attention has been given locally and internationally to the poor attitudes of health workers in developing countries which more than anything else can make effective risk communication well-nigh impossible. This may be because the healthcare systems in most highly resourced countries place serious emphasis on patients' rights, including informed consent, and on their well-being to the extent that this practice is assumed to be a worldwide phenomenon. However, a recent article on nurses' attitudes to patients and

how these attitudes negatively impact on healthcare delivery paints an entirely different picture.^[58] Whilst this study was in Kenya and focused on nurses, the findings could almost certainly be generally applied to all categories of health workers (physicians, pharmacists, midwives, nurses) in most, if not all, sub-Saharan African countries. The reasons for such attitudes are numerous and varied and include inadequate training, professional arrogance, commercial priorities, huge patient load, poor facilities for practice, low status and remuneration, low numbers of health workers and poor communication practices among healthcare workers and between healthcare workers and the general population. A common culture of deference and conflict avoidance also disables patients from being more demanding or inquisitive. This area requires urgent understanding and attention since the attitudes of health workers and the way healthcare workers deal with patients profoundly influence patients' perceptions of risk, adherence to treatment and their ultimate good health.^[59-61] It is to be hoped that medical education, including ambitious new Doctor of Pharmacy (PharmD) courses, will tackle these deficiencies energetically.

11. The Future of Risk Perception and Communication in Africa

Risk perception and communication in Africa is an extremely challenging enterprise, not least because of urgent and immediate demands such as lack of medicines, shortage of human resources, increasing numbers of patients, poor financial resources, weak or newly emerging health systems, poor crisis preparedness and resources for dealing with disease outbreaks. When basic priorities are so pressing, critical, but subtler and more elusive priorities such as risk communication and pharmacovigilance, can easily be put to one side. Nonetheless, the experience from well resourced

countries indicates the importance of having a robust system for rumour surveillance,^{4,[62,63]} risk identification, risk communication and investigation, crisis management and analysis of the consequences of any action taken to improve the perception and communication of risk, and its future management. This is critical in all areas, but especially so in the area of medicines and vaccines for diseases of public health importance. Constant engagement of the public through radio and TV programmes especially when there is no crisis, constant education of the public on the benefits as well as risks of medicinal products (see, for instance, Dodoo^[64]), and open and transparent systems for the design and delivery of public health interventions, along with intense consultation, are key to success.

The successful management of the diethylene glycol poisoning in Nigeria,^[44] occurring, as it did, not long after the polio crisis, indicates that even within the same country, official grasp of public concerns and timely investigation and response can lead to successful outcomes. The suspension due to 'logistical reasons' of the mass administration of albendazole and praziquantel for the control of schistosomiasis in southern Malawi, is a timely example of a healthy shift from a 'government knows it all' attitude associated with autocracies to a situation where the perceptions and anxieties of the population influence public health decisions and programmes, even if the outcome in this case might be regarded as somewhat paradoxical.

There are several unanswered questions as to what represents best practice on the continent and, indeed, whether 'best practice for the continent' is a viable vision, given the great cultural, social and other differences between countries. For instance, why did polio vaccination continue in most African countries despite the controversy in Nigeria and why does the combination of

4 Monitoring of non-traditional media and other channels can produce rapid and effective early warning of all kinds of problems in health. As one example, since 2000, the WHO Global Outbreak and Response Network, incorporating Health Canada's Global Public Health Intelligence Network (1997) has been working with partners all over the world to monitor thousands of public news and other sources across the world for emerging and urgent issues of interest. 'Ears to the ground' in remote and major locations may often alert attention to news of suspected or actual events much more quickly than official networks or data-collecting channels.

amodiaquine + artesunate enjoy patronage for the treatment of malaria despite the questions raised in Ghana? What is the exact contribution of poor health provider attitude towards risk perception in African countries? How significant is the effect of democratic governance on risk communication?

Good legislation and science-based regulatory practice will contribute to greater rationality and safety in healthcare. Proper funding and resources for pharmacovigilance, public health surveillance and data collection, the mandatory inclusion of safety monitoring in all public health programmes, and crisis preparedness, will all have a radical impact on risk management, risk communication and risk perception. Bringing medicines safety into the heart of medical education and practice will transform relationships with patients and encourage them to be active partners in the management of their own lives. National leadership in all these areas needs to be visionary and strong, learning from international experience, but not uncritically adopting systems and processes that are alien to their local environment and needs.

The increasing numbers of countries in Africa joining the WHO Programme for International Drug Monitoring,^[65] as well as the improving media landscape, which involves widespread use of mobile phones and social media, are all likely to provide not just answers to some of these questions but also new options for improving risk perception and communication. The challenges on the continent remain enormous, but the path forward is being mapped and explored.

12. Conclusions

Human beings make reckless choices about their own safety all over the world, but there is nowhere, except in authoritarian countries, where citizens will quietly accept what they see as unacceptable risk imposed on them by the authorities. Public assessment of risk as acceptable or unacceptable is driven by idiosyncratic, non-rational perceptions much more than by rational, scientific understanding. In every region of every country the variables determining those perceptions are different to a greater or lesser extent.

The challenge for governments and public health programme managers is to gain an intimate understanding of the minds and feelings of their constituencies, and to be seen as deeply involved in their communities. Only then can accurate and effective plans be made to establish trust, to explain and educate, to build partnerships and collaboration.

This process holds good for every country in the world, but is especially pertinent and urgent for Africa because of the special deficits and problems: strong ethnic, cultural and religious beliefs and influences; large rural, poor, uneducated, often remote, populations; deficits in literacy, numeracy and scientific education; weak systems, legislation and communications capacity; variable competence and skills of officials and health workers. Each of these defines needs for future action, with one overarching priority: to engage populations and individuals in strenuous debate and learning about medicines and medicines safety in order to make better decisions about personal and public health issues; to pay serious attention to current beliefs and perceptions and progressively negotiate a path towards safer and more balanced beliefs, perceptions and choices.

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