

Diagnostic quality in rural health centres in Burkina Faso

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Summary

OBJECTIVE To study the quality of diagnostic practice in rural Burkina Faso.

METHOD In 9 health centres of 3 districts, 313 outpatient consultations were observed, and 417 diagnoses by 15 nurses were analysed. Criteria for evaluation of patient history and clinical examination were based on the diagnostic guidelines distributed by the Ministry of Health.

RESULTS In only 20% of the diagnoses the nurses took a sufficient history and in only 40% they conducted a sufficient clinical examination. In 21% patients underwent no clinical examination at all. Only 12% of all diagnoses were based on sufficient history-taking and adequate clinical examinations. The individual elements of clinical examination were performed correctly in 82% of cases. The variation between nurses was immense, but no correlation could be found with regard to their basic training. However, nurses who had received the diagnostic guidelines examined patients more carefully than those who had not. Larger numbers of patients per day are not associated with shorter nurse-patient contact, and neither is sufficiency of patient history associated with duration of the consultation.

CONCLUSION The low diagnostic quality of the outpatient consultations in the studied area indicates that this issue has been neglected in national public health initiatives. But examination skills are good and diagnostic guidelines may have had a positive effect on the diagnostic quality.

keywords diagnosis, history taking, Burkina Faso

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Introduction

In 1991 the Ministry of Health in Burkina Faso established a technical commission for creating national diagnostic and therapeutic guidelines whose 18 members were mostly physicians but also pharmacists and sociologists from different national and international organizations offering health care in the country. The intention was to create a consensus on rational diagnosis and treatment for the most frequent health problems at the first level of care based on scientific knowledge and the regional resources available. The guidelines were to serve as treatment standards for nurses in the field and contain flow-charts indicating the questions and clinical examinations necessary for a given complaint. According to the results of these examinations, a treatment is recommended without specifying the name of the disease.

In 1993 the Burkina Faso Ministry of Health published the

guidelines 'Strategies of diagnosis and treatment for the first level of health care' (Anonymous 1993) with financial and technical support of the WHO and the German Development Organization (GTZ). In the same year an essential drug programme was introduced in Burkina Faso due to the national commitment to the Bamako Initiative: village pharmacies have been opened and essential drug supply systems built up. Nurses have been invited to training courses about the essential drug policy and the guidelines were presented to them. Heidelberg University was asked by the Ministry of Health to evaluate the quality of health services at the first level of care in rural Burkina Faso with special consideration of the recent introduction of essential drugs and the new treatment guidelines.

While much attention is being paid to the supply of drugs, the assessment of quality of the consultation itself is often limited to indicators such as consultation time or patient

Table 1 Training of nurses and distribution by age and sex

Title	Training and occupation	Age distribution	Male	Female
State nurse	3-year training with state exam at the end, responsible for health centre	36	1	0
Short course nurse	2-year training course; training less demanding than for state nurse, responsible for health centre	24-34	6	1
Itinerant nurse	1-year training, intended mainly for health promotion activities but often replacing the nurse when absent	25-35	5	0
Nurse aid	No standardized training, intended mainly for assistance in health centres	36	1	0
Auxiliary midwife	2-year training as midwife, intended to deputize nurse when absent	28	0	1

satisfaction (Mc Pake *et al.* 1993; Litvack & Bodart 1991; Gilson *et al.* 1994). Professionally defined diagnostic quality remains an often-neglected issue in quality assurance. This especially affects rural areas in developing countries where (partly due to geographical remoteness) regular supervision is often insufficient and referral systems do not work (Snell & Dualeh 1988).

We analysed the diagnostic quality in health centres. Using methods of nonparticipating observation, this study is part of a survey aiming to investigate the quality and the effectivity of health care, including consultation in the health centre, dispensing of drugs in village pharmacies and drug-taking behaviour of the patients.

Burkina Faso has approximately 10.5 million inhabitants and comprises 30 provinces. The study took place in the Tougan, Nouna and Solenzo Districts of the Sourou and Kossi provinces in north-west Burkina Faso. Every district capital has one medical centre and there are 6-14 health centres in the surrounding villages. Each health centre covers a population of 10,000-15 000. The staff of a health centre generally consists of one nurse, a nurse aid and a midwife as well as one drug vendor for the nearby village pharmacy. The health personnel is trained and paid by the state. Traditional and nonformal suppliers of health care play an important role in this area, but were not the object of this study. More than 10 ethnic groups live in the studied area, most of them with their own language.

Materials and methods

Study design and study population

The field study lasted from June 25 until July 26, 1995. All general consultations (313) in 9 health centres were observed for two weeks by guided observation. Surgical treatments and wound dressings were not the object of this study and

therefore not included in the evaluation. Of those 313 patients, 46.6% were female; 33.7% were under 5 years old; 8.9% were aged 5-14 years; 46.9% were 15-49 years old.

Since nurses could name more than one diagnosis per patient, 417 diagnoses were analysed. 15 nurses were involved in the treatment of patients. Most of them were men, which reflects the prevailing gender bias among health professional in the country. Although they had different levels of professionals training (Table 1), for the sake of clarity they are all referred to as nurses. Additional semistructured interviews were held with the nurses to determine their training background and access to the treatment guidelines.

Evaluation criteria

All evaluation criteria for sufficiency of the patient history and of the clinical examination were defined beforehand, and a variety of signs and symptoms likely to be presented during consultations were chosen. For each of those signs and symptoms, a separate observation form was designed with corresponding questions and examinations according to the guidelines. Observation forms consisted of a base form and a set of 10 subforms for the most frequent signs and symptoms. These were designed in a highly structured manner, basically following the INRUD recommendations (Arhinful *et al.* 1994). Each form had sufficient space to add additional observations. Participants recorded their observation using the subforms that would best fit the given complaints and symptoms and if necessary using several subforms. The observation forms were tested and revised in two pre-tests in a health centre which did not participate in the study.

In the evaluation stage, the cases were re-allocated according to the diagnosis given by the nurse and the observations transposed. This reallocation caused no major problem as the observers' documentation was very detailed

Table 2 Criteria for assessment of sufficiency of the patient history and the clinical examination

Patient's signs	Essential questions	Essential examination
Respiratory complaints	Duration of the disease <i>or</i> association with fever*	Taking the temperature and thoracic auscultation <i>or</i> taking temperature and counting respiratory frequency
Diarrhoea	Blood in the stool and duration of the disease	Estimating state of dehydration, e.g. by skin fold
Painful micturition	Turbid urine	Palpation of the pelvic region <i>or</i> taking temperature
Blood in the urine	Association with fever* <i>in women</i> : pelvic pain	Taking the temperature <i>in women</i> : pelvic palpation
Blood in the stool	Painful defecation	Inspection of the anal region
Convulsions	Association with fever* and occurrence of similar symptoms before	Taking the temperature <i>or</i> flexure of the neck
Painful ear	Purulent excretion and association with fever *	Inspection of the ear with the naked eye
Eye complaints	Sensation of sand in the eye	Inspection of the eye and revulsion of the upper eye lid
Abdominal pain	Localization of pain and association with diarrhoea or constipation	Abdominal palpation
Fever (used for 'Malaria')	Duration of the disease.	Taking the temperature
Skin complaints	<i>In women</i> : recent delivery or abortion Pain or itching sensation and affection of other part of the body	Inspection of the affected skin area
Painful joints	Localization <i>and</i> association with fever*	Taking the temperature <i>or</i> in cases of localized pain inspection of the affected joint

*When temperature was measured asking for fever was not mandatory

and complete. For each sign/symptom a set of mandatory questions and examinations was selected (Table 2). If all corresponding selected elements of clinical examination had been executed, the examination was rated 'sufficient'. Since the same method applied to the evaluation of patient histories, due to operational reasons the standards applied in this study are set much lower than the guidelines published by the Ministry of Health.

Sufficiency was analysed separately from the quality of examination. A list of evaluation criteria was defined for 26 different elements of clinical examination to assess the quality of clinical examinations. A selection of this checklist for the 5 most frequently used elements is presented in Table 3.

Possible accompanying factors such as different languages of nurse and patient or general communication problems were assessed. A communication problem was defined as a situation in which independently of the use of a translator a misunderstanding or non-understanding occurred between nurse and patient.

Hidden and guided observation

Hidden nonparticipant observation was chosen as a method to minimize the influence of the observers on the nurses'

activities. Observation was combined with a study aiming to assess patients' drug-taking compliance. This justified the presence of the observer during general consultation. Nurses were invited several weeks before and informed about the intended study, but were not told that their diagnoses and their prescribing habits also were the object of investigation. During the two weeks' observation period, the observers lived in the village close to the health centre, thus allowing them to follow consultations even outside normal hours.

Table 3 Excerpt from predefined criteria for quality assessment of clinical examination

Element of examination	Criteria
Undressing the patient	Pulmonary signs: undress thorax Gastrointestinal signs: undress abdomen
Measuring temperature	Disinfection of the thermometer Return mercury to its lowest position
Thoracic auscultation	Bilateral, anterior, posterior, basal and apical auscultation Positioning the stethoscope directly on the skin
Eye inspection	Sufficient illumination Comparison of both eyes

Table 4 Distribution of the nurses' diagnoses

Diagnosis	No. of cases	Percent
Malaria	157	32.3
Diarrhoea	58	11.9
Wounds	41	8.4
Respiratory tract affections	36	7.4
Gynaecological disorders	24	4.9
Abdominal pain	9	1.9
Conjunctivitis	15	3.1
Bone and joint pain	15	3.1
Ear disease	14	2.9
Undetermined (no specific diagnosis or symptom was named)	63	13.0
Other (diagnoses named only once or twice and not belonging to the groups above)	54	11.1
Total	486	

Study personnel

The observers (5 men, 1 woman) were national medical students and nurses with knowledge of at least two of the predominantly used languages in the area. They had all participated in a three-day training course followed by a one-day refresher course and contributed to the design of the observation guides. After the two-week observation period, 3 of the 6 observers were moved to 3 other health centres to continue there. During the observation period, study supervisors for each district as well as the principal researcher reviewed the observation sheets, asking for missing information or clarifying additional comments of the observers in order to minimize interobserver variation.

Statistical analysis

Analysis was mostly based on the diagnoses. When a consultation with more than one diagnosis was analysed (e.g. in relation to consultation time) then the diagnosis first named by the nurse was taken, as we assumed that the nurse would regard this as the main diagnosis. For statistical analysis Epi Info 6.02 software was used and a significance level of $P < 0.05$ was chosen.

Ethical considerations

The study was designed in co-operation with the regional district medical officers (DMO). It was then presented to representatives of the Ministry of Health for approval. The study was approved with the condition that the identity of nurses and vendors not be revealed to their DMOs nor to other persons. For this reason the specific villages are not named. The aim of the study is not to identify efficient or less

efficient nurses but to assess the overall quality of diagnosis and its accompanying factors. The observers also had strict instructions not to participate actively in the general consultations unless a patients' health was clearly at risk. (This happened in one case, where the nurse was absent and the observer was confronted with a patient badly hurt by a cow. The observer initiated treatment and organized evacuation of the patient to another medical centre.)

Results

General features

We counted an average of 3.2 nonsurgical consultations per day. The average ranged from less than one patient per day in one health centre to 6.3 per day in another one. The distribution of diagnoses is presented in Table 4. The median duration of a consultation was 12 min (standard deviation (s.d.) = 6.78; mean = 13 min). Consultation time was not significantly reduced in those health posts where the number of consultations per day was higher. Only 8 of 14 interviewed nurses stated that they had received the therapeutic guidelines during the course on rational drug use.

In 14% of the consultations the nurse and the adult patient (> 19 years) could not communicate in the same language. This happened more often to women (24%) than to men (10%) ($n = 179$, $P = 0.012$), but according to the ratings done by the observers, there was no difference in communication problems between the two sexes (7% for female, 6% for male adult patients).

Sufficiency of history taking

For 20% of the nurses' diagnoses, taking of the history

Table 5 Sufficiency of patient history and clinical examination according to predefined criteria (Table 1). Comparison of different diagnoses and other influencing factors

	Sufficiency of patient history			Sufficiency of clinical examination		
	Acceptable/total	%	Difference	Acceptable/total	%	Difference
Total	84/417	20		167/417	40	
By nurse (with > 20 observations; d f = 7)						
Nurse with highest rate	17/41	41		31/41	76	
Nurse with lowest rate	3/48	6	$P < 0.001$	10/75	13	$P < 0.001$
By nurse's training						
State nurse	4/22	18		13/22	59	
Short course nurse	43/221	20	$P = 0.984$	81/221	37	$P = 0.249$
Itinerant nurse	23/122	19		53/122	43	
Nurse aid	6/26	23		11/26	42	
Auxiliary midwife	1/7	14		2/7	29	
By availability of diagnostic guidelines						
Guidelines received	47/189	25	$P = 0.078$	89/189	47	$P = 0.002$
Guidelines not received	27/158	17		49/158	31	
By nurse diagnosis						
Malaria	46/148	31		100/148	68	
Diarrhoea	7/53	13	$P = 0.016$	7/52	13	$P < 0.001$
Respiratory tract affection	12/31	39		21/34	62	

fulfilled predefined standards, i.e. the nurse either asked for necessary information or received it in another way, e.g. by spontaneous description by the patient. In the remaining 80%, at least one crucial item of information for the corresponding diagnosis was neither asked for nor obtained otherwise. The interindividual differences between nurses for sufficient histories ranged from 6% to 42% (Table 5). Those differences remain when controlling for the diagnosis as a possible confounding variable. The median consultation time for consultations with sufficient histories was 11 min (mean = 12.0; s.d. = 5.59; $n = 69$); for those with insufficient histories, 12 min (mean = 12.7; s.d. = 6.52; $n = 230$).

Sufficiency of clinical examination

Forty percent of the diagnoses were based on sufficient clinical examination; in 39% the examination lacked an essential part, and in 21% no examination was conducted at all. The median consultation time was 12.5 min for cases with sufficient examinations (mean = 13.5; s.d. = 6.15; $n = 126$) and 10 min (mean = 11.8; s.d. = 6.34; $n = 173$) for those without. In one health centre the thermometer broke at the beginning of the observation period and was not replaced until the end of it, nor did the nurse make any effort to replace the thermometer. If the data from this particular health centre were deleted from the analysis, 46% of the clinical examinations would be rated sufficient (157/339). Adequate clinical examination is clearly associated with sufficient patient history ($P < 0.001$). Only 12% of all

diagnoses were based on sufficient histories and examinations.

Quality of clinical examinations

Individual elements of clinical examination were performed well, i.e. according to predefined standards in our checklist, in 82% of cases. The results differ depending on the kind of examination: abdominal palpation, for example, was performed correctly in 79% of cases (as opposed to only 36% of thoracic auscultations (Table 6).

Differences between nurses

Although the sufficiency of patient history and clinical examination varies immensely between the nurses, there was

Table 6 Quality of single elements of clinical examination according to predefined criteria (Table 3)

Examination	Correct examinations/ executed examinations	%
Measuring temperature	157/169	93
Undressing the patient	84/110	76
Thoracic auscultation	17/47	36
Eye inspection	18/22	82
Abdominal palpation	15/19	79
Total	374/456	82

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no correlation with the nurses' basic training. Differences were seen between nurses who had, and nurses who had not, received the diagnostic guidelines during the training course: While the difference for the taking of the patient history (25% sufficient histories with guidelines *vs.* 17% sufficient without guidelines) is not significant, the differences for the management of clinical examination are more important: Nurses who had received the diagnostic guidelines conducted sufficient clinical examinations in 47% of the cases as opposed to 31% where nurses had not received them (Table 5). The quality of diagnostic procedures for different diseases varies significantly: diagnostic procedures were insufficient in diarrhoea cases more often than for malaria and respiratory tract illnesses (Table 5).

Discussion

Assuming that good diagnostic quality requires sufficient and good clinical examination and clinical history-taking, our findings clearly show that diagnostic quality in the studied health centres is low.

Comparison with other studies

There is little evidence to think that the average of the health centres in the country should function differently than the health centres of our study. In an earlier participant observation study in the district of Solenzo, diagnostic procedures were rated congruent with the diagnosis in over 60% (Lougousse 1986).

In Angola a similar study observing nurses at primary level outpatient consultations found that history-taking was adequate in 54% of cases and examination in 29% (Björck *et al.* 1992). Those results differ from ours but comparison is almost impossible, because in both studies judgement was not based on predefined rating criteria, but on the individual observer's judgement. In Bangladesh a study in different health facilities found that only 37% of the patients had been adequately examined according to predefined (but unpublished) criteria (Guyon *et al.* 1994).

Effect of training and guidelines

The nurses are not to be blamed alone, and highly trained physicians in industrialised countries may not perform any better regarding some aspects (Harrison *et al.* 1993). This study shows that the nurses do have the skills for clinical examinations; only they do not apply them. Astonishingly, differences in training did not make any difference in the nurses' performance. And it is depressing that almost half had not received the guidelines although they should have been accessible to all. The reason for this is still not clear and

needs further investigation. But there is hope: if nurses have access to diagnostic guidelines, they tend to base their diagnoses on sufficient examinations.

Experience from other countries shows that guidelines often are not well accepted by users (Brook 1989; Haines 1992). In the case of Burkina Faso, it was mainly physicians who contributed to the guidelines, nurses were not involved. An analysis of the didactic structure of the guidelines shows that their use was often impractical; the design of the flow charts is not always clear (Dr M. Sanou, personal communication), which are two of the reasons why the guidelines are poorly understood or not used at all by the nurses.

Validity of consultation time as an indicator for diagnostic quality

The investigation of consultation time as a possible indicator for diagnostic quality revealed that in health centres with a higher workload (number of patients per day) consultation time is not reduced; sufficiency of patient history is not associated with duration of the consultation; and that consultations with sufficient clinical examinations may last longer than those with insufficient examinations. Our findings suggest that consultation time, although often used, is not always a valid indicator for measuring quality of health services. This is especially true in our setting, where a very low number of patients are seen each day. In fact, there is reason to believe that a low number of patients seen leads to a lack of clinical experience and therefore to lower clinical competence of the nurses.

Methodological considerations

While attempting to investigate diagnostic quality, we must clearly bear in mind the difference between correct diagnosis and good diagnosis. While one physician may come to the conclusion that his patient has a certain disease purely by inspiration and be right, another may, after a thorough history and examination, still come to the wrong conclusions and end up with a wrong diagnosis. Both cases happen to all health professionals no matter how well trained and experienced they may be. But we believe it to be a common understanding that physicians who follow complete diagnostic procedures are much more likely to come to the correct diagnosis.

Diagnostic quality is not only finding the right diagnosis for a given case, but reaching diagnosis by rational, reproducible procedures commonly subsumed under the term 'good medical practice'. Consequently our study can only examine adherence to good medical (diagnostic) practice, which in the context of this paper is called diagnostic quality.

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Any attempt to analyse and compare the diagnostic quality of health care services is only as valid as the predefined criteria by which it is judged. One can always argue that in a given case a certain diagnostic tool may not be necessary and if standards follow impracticable textbook requirements, low performance results will be inevitable (Kassirer 1993). The poor results in the diagnosis of diarrhoea found in this study may be partly due to such a definition effect. We leave it to the reader to decide whether he or she can agree with our criteria. But we would like to point out that our requirements for sufficiency of diagnostic activity were much more humble than those proposed by the national diagnostic guidelines, and we believe that many colleagues would prefer to see higher standards applied.

The criteria for the quality of examination (as opposed to sufficiency of examination) were partly more demanding although they had been determined by national practitioners in the field, physicians as well as nurses. The low outcome of correct thoracic auscultation may be due to the requirement that eight auscultation points had to be used, and it is likely that many physicians in any other country would fail to do this, too. On the other hand, the results show that, even though the checklist contains rather demanding criteria, the nurses did accomplish high rates of correct procedure.

As expected, the internurse variation was immense, which also proves the sensitivity of our methods. Attempts to break those differences down into further nurse-related determinants (other than professional training and accessibility to guidelines) are statistically not convincing with the given material.

We cannot rule out that the observers' presence influenced the nurses' behaviour. Comparison of prescribing behaviour before, during and after observation showed that no changes occurred during or after presence of the observers (Krause *et al.* 1996). It is likely that this is also true for diagnostic behaviour. In fact, we would rather expect a Hawthorne effect in the sense that nurses would follow more strictly the guidelines during the presence of the observers. So in reality diagnostic quality might even be worse without presence of observing persons. Another methodological problem is possible interobserver variation, which cannot be ruled out completely. Specific analysis showed that interprescriber variation remained extremely high comparing two prescribers observed by the same observer.

Implications for essential drug policy

Despite the methodological difficulties of such studies, we found enough evidence to conclude that diagnostic quality is low and may even present a health hazard for the patient. Important priorities such as the promotion and distribution of essential drugs may in the past have overshadowed this

crucial element of quality in health care. But how good can a drug be, if essential diagnostic procedures to determine its correct choice are not applied? In other words, how can we expect rational drug use if the diagnosis is irrational?

Recommendations

Despite all methodological constraints of such a study we cannot deny that diagnostic quality (at least in the given setting) needs improvement. More emphasis in national and regional health policy needs to be placed on this subject. We propose:

- to discuss the findings with nurses and supervisors and raise interest for this important aspect of health care, and to make clear that quality of health care does not only depend on a complete stock of medicines or the accessibility to more technical equipment;
- to create supervision schemes for the supervisors of the health centres which include assessment of diagnostic quality;
- to establish quality assurance measures and to enable the nurses to assess and improve the quality of their work;
- to revise the national training curricula for nurses (and physicians), emphasizing the importance of history-taking and physical examination;
- to revise the diagnostic guidelines and improve their didactic structure;
- to make the guidelines more accessible.

(Brook 1989; Haines 1992; Oeydiran 1993; Van Dyk *et al.* 1994)

Quality of health care cannot be measured by assessing indicators such as consultation time (as mentioned above) or patient satisfaction (Pickering 1993) alone. Health care is a complex and intellectually demanding profession; it needs to satisfy not only clients but also basic standards of good medical practice (Brook 1989; Pickering 1993; Haddad & Fournier 1995). More emphasis must be put on this goal both in research and in training.

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