Intervention

The lesson of Monsieur Nouma: Effects of a culturally sensitive communication tool to improve health-seeking behavior in rural Cameroon

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ABSTRACT

Objective: To test the effect of patient counseling using educational tools, on rates of return for follow-up in newly diagnosed hypertensive and/or diabetic patients in a rural African context.

Methods: Free screening for hypertension and elevated blood glucose was offered in primary health care centers in central Cameroon during 9 campaigns of 3 days each. Individuals with untreated hypertension and/or diabetes were divided into 2 groups: a control group receiving counseling according to routine procedures, and an intervention group receiving counseling with different educational tools to explain the diagnosis and its implications to the patient.

Results: Prevalence of hypertension and/or diabetes in the screened population was 41%. At 3 months from screening, rates of return visits were higher in the intervention group than in the control group: 55/169 (32%) vs. 15/92 (16%), OR 2.4; 95%CI 1.3–4.7; p < 0.001.

Conclusion: Screening may identify untreated individuals efficiently. Rates of return visits after screening, although low in both groups, could be doubled by a short communication intervention.

Practice implications: This study suggests that modest communication interventions, e.g., the application of educational tools, may bring important benefits and increase the effectiveness of public health measures to combat chronic diseases in settings of limited resources.

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1. Introduction

Chronic non communicable diseases, in particular cardiovascular diseases (CVD) pose an enormous challenge to health systems, especially in low and middle income countries. Already struggling with acute infectious diseases and HIV, health-care systems are unprepared to tackle exploding rates of illnesses such as hypertension, diabetes and overweight. This is a serious shortcoming, as in these countries CVD is the leading cause of morbidity and death in people aged over 35 years [1–3].

CVD prevention is most efficiently achieved by controlling risk factors, e.g., hypertension, over a long period of time. This requires several conditions to be fulfilled in sequence: (1) individuals at risk must be identified (2) individuals' awareness of illness must translate into care-seeking behavior, (3) lifestyle-measures and long-term treatment must be adhered to, and (4) treatment response needs to be adequate.

In high income countries, where over 75% of cases are detected [4] and the frequency of routine consultations is high, conditions 3 and 4 are most in need to be tackled [5]. In developing countries, however, the major challenges are underdetection (less than 30% identified) [6] and high drop-out rates [7]. The latter tend to be highest at the beginning of therapy: drop-out rates of around 30–50% within the first 3 months and 80% within the first year have been reported from hypertension programs in Cameroon [8,9], Tanzania [10] as well as the Seychelles [11]. The reason seems partly to be patients' high out-of-pocket expenditure on treatments and transport [12,13]. In addition, observational studies from different African countries have identified lack of awareness about the nature and the possible consequences of hypertension and diabetes as a major barrier to retention and treatment adherence [14,15]. In Tanzania, more than half of hypertensive patients could not list a single complication of hypertension when asked [10].

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Faced with these facts, measures to identify, educate and motivate untreated individuals to return for follow-up are urgently needed. However, such initiatives will need to take into account the limited financial resources available in low-income settings.

Individuals diagnosed with an illness typically go through a process of change before actively seeking help and treatments. This starts with acknowledging the problem and reaching the conclusion that the problem is worth tackling. This mentally prepares the individual to take action and seek care [16]. This process of change can be influenced and encouraged by patient-centered counseling techniques such as motivational interviewing [17].

In low- and middle-income countries, communication training for healthcare staff in other disease areas has been shown significantly to increase individuals’ awareness, satisfaction, as well as rates of return for follow up visits [18]. Furthermore, the use of visual communication aids, e.g., illustrated patient information leaflets (PILs), has been shown to be very effective to communicate health messages. Such tools improve the emotional impact, recall of information, and adherence to treatment in different contexts, including in African patients [reviewed in Ref. [19]]. The impact seems greatest in low-literacy populations, as demonstrated for correct drug administration and compliance in non-literate women in Cameroon [20].

In the present study we hypothesized that in order to address the first two conditions (to identify individuals at risk and to promote care-seeking behaviour), two interlinked interventions would be needed. We thus conducted screening campaigns to detect individuals at risk, and combined the campaigns with motivational counseling at the time of screening to increase the rate of participants who returned for follow up and treatment.

The main objective of the study was to test the impact of counseling with an educational tool on rates of return for follow up in newly diagnosed individuals with hypertension and/or diabetes, compared with routine procedures. The effect of communication aids like PILs on participants’ motivation to return for follow-up, has to our knowledge not been tested before in the context of cardiovascular conditions, certainly not in Sub Saharan Africa.

A secondary objective was to investigate the usefulness of screening campaigns measured on detection rates of individuals at risk and on return rates for follow-up.

2. Methods

2.1. Study setting

The study was conducted in the health districts of Mfou, Mbankomo, Soa and Olaba, which are all situated in the central province of Cameroon. All districts are included in a chronic disease program (Programme de lutte contre les maladies chroniques [PLMC]) run by the Cooperation Cameroon Jura Suisse. This primary health care project covers an estimated 400,000 inhabitants in eight rural or semi-urban districts. The program has implemented hypertension and diabetes type 2 care in all primary health care facilities in the area. Such health care centers in Cameroon are mostly led by a non physician clinician (NPC), typically a nurse or a nurse’s aid.

All facilities where the screening campaigns were conducted possessed a sphygmomanometer and a glucose meter and stocked a minimum of two antihypertensive drugs and one oral antidiabetic.

All activities were carried out by local staff, supervised by either one of the authors (N.G.) or a senior nurse specializing in cardiovascular conditions. As part of the PLMC, most health center staff members had attended a two-day training on hypertension and diabetes within two years of the beginning of the campaign.

![Fig. 1. Participants’ flow.](image-url)
2.2. Screening campaigns and included individuals

The study design is shown in Fig. 1. Inclusion criteria for the study were the presence of untreated hypertension and/or diabetes. Free screening for hypertension and elevated blood glucose was offered during 9 campaigns of 3 days each. In addition, age, sex and BMI were assessed for all individuals screened. All data were gathered without recording individual names.

Individuals with high blood pressure (>140/90 mmHg) and/or diabetic fasting glucose levels (>7.0 mmol/l) on screening were invited to take part in the study, in the context of which they were counseled according to their conditions. Individuals who showed impaired fasting glucose levels (5.6–6.9 mmol/l) or obesity (BMI > 25 kg/m²) received counseling about life style changes but were not enrolled.

All participants gave written consent. There were no refusals to participate. Names and additional demographic data were obtained with the help of a second questionnaire (Table 2), which also recorded current or previous treatment. Only treatment-naive participants were included in the study. Treatment-naive was defined as being diagnosed for the first time or being aware of the condition but neither under medical treatment/lifestyle measures, nor having consulted for the condition within the last 4 months. All data were handled by the investigators with full confidentiality of participants ensured.

2.3. Interventions

Participants were divided into two groups: a control group (A) consisting of all individuals enrolled on Day 1, and an intervention group (B) comprising all individuals enrolled on subsequent days (day 2 and 3). Participants from the intervention group were further divided into three subgroups receiving different interventions (B1, B2, B3).

For the control group (all participants on Day 1), staff were told to follow PLMC guidelines on patient counseling as well as on therapeutic procedures. At the end of day 1, a one-hour education session on the use of educational tools and counseling was provided at each facility for the head NPC and one employee at the respective center. To investigate the effect of different modes of explanations, staff were trained in explaining the diagnosis and its implications to the participants in 3 different ways, with the help of 3 different educational tools.

On day 2 and 3 all participants were sequentially and anonymously allocated to 3 subgroups (B1, B2, B3). In each subgroup, participants were taught about simple pathophysiology, the chronic nature of the illness and necessary lifestyle measures for about 10 min employing the respective tool (PIL/model, see below).

Every staff member performed all three interventions according to the subgroup his/her participant was allocated to.

Follow-up appointments were scheduled within a few days up to one month according to the severity of the condition following PMLC guidelines. For newly diagnosed participants, a confirmation of the diagnosis on a second consultation was mandatory, before starting medical treatment. In cases of hypertensive crisis (>220/120 mmHg) or very high blood glucose levels (>17 mmol/l) a free emergency treatment was offered immediately and the participant was put under close observation. Such participants remained in the study if previously untreated.

2.4. Educational tools

Two PILs with different emotional emphasis were used, designed by a team of Cameroonian doctors and nurses and a local graphic designer. The first, used in group B1, gave a positive message: “you can stay in good health with hypertension/diabetes if you take action now” and displayed a healthy and pleased-looking old couple. The second, used in group B2, emphasized the possible negative consequences of neglecting the condition and said: “Your condition can have serious consequences, if you don’t take action now” and showed individuals suffering from secondary effects of CVD, such as paralyses for hypertension and chronic ulcers for diabetes. The content on the two inside pages was same in both PILs: lifestyle changes and the importance of long term follow up were described and depicted graphically. The third tool (‘Monsieur Nouma’, pictured in Appendix A) used in Group B3, was a simple model of a man dressed in local fabric with his torso and head cut open (ca. 40 cm long, made from papier-mâché by the first author). The model was equipped with a rubber pump which could be pushed to represent the heart. The outlet of the pump could be occluded to demonstrate cardiac effects of increased afterload in hypertension. A ruptured vessel in the brain pointed to possible sequels of untreated hypertension. Effects of untreated diabetes on small vessels, e.g., in the eyes and the limbs were explained verbally.

2.5. Outcomes measurements

The primary endpoint of the study was the difference in follow-up rates between the control group (A) and the intervention group (B). Follow up was defined as ≥ 1 return visits within 3 month from the screening. Data were gathered from the entries in the registers of the health care facilities at 3 months after the end of the campaign. Consultations for a problem unrelated to the study were not considered. Participants in the campaign having stated their intent to be treated outside the area of investigation were excluded from the outcomes analysis.

Secondary endpoints were: the difference between group A and B in the number of subjects returning ≥ 2 times within 3 months and differences in follow-up between the intervention subgroups (B1, B2, B3), where different tools were used.

Furthermore, subgroup analyses were performed to identify independent patient-variables and socio-demographic parameters, that might influence follow-up rates. Subgroup analyses in diabetic participants and in participants aware of diagnose were also performed for the main outcome.

2.6. Statistical analysis

For the primary outcome a binary logistic regression model was used with the group (intervention group B or control group A) the predictor variable and return for follow-up the outcome variable. Results are reported as raw outcomes, as well as adjusted for possible confounders. The adjusted results derive from a multivariate logistic regression model. To include further possible confounders, given the small size of the groups, all covariates where the difference between the groups achieved a significance level ≤ 0.1 were included in the model. Table 2 lists the assessed covariates. The primary outcome is reported as rates of participants returning for follow-up and as crude and adjusted odds-ratio for returning. Statistical analysis was run on STATA® 10.1. Data are presented with 95% confidence intervals. All p-values are two-sided.

3. Results

3.1. Participant flow

Participants’ flow through the study is shown in Fig. 1. A total of 837 individuals participated in the screening and data on 825 participants were analyzed (12 individuals were excluded because of incomplete data). 339 individuals (41%) screened positively for hypertension and/or diabetes. Among those, 70 (21%) were currently under treatment and were excluded from the study.
Table 1
Demographic characteristics of population screened.

<table>
<thead>
<tr>
<th></th>
<th>Total population screened (n = 825)</th>
<th>Negatively screened for HT and DM (n = 486)</th>
<th>Positively screened for HT and/or DM (n = 339)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>562 (67%)</td>
<td>317 (57% of F)</td>
<td>234 (43% of F)</td>
<td>0.271</td>
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<tr>
<td>Male</td>
<td>275 (33%)</td>
<td>168 (61% of M)</td>
<td>105 (39% of M)</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1 (0.15)</td>
<td>1 (0.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age, years (±SD)</td>
<td>54 (±16)</td>
<td>49 (±16)</td>
<td>62 (±12)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI mean, kg/m² (±SD)</td>
<td>24 (±5)</td>
<td>24 (±5)</td>
<td>24 (±5)</td>
<td>0.311</td>
</tr>
<tr>
<td>Waist circumference, cm mean (±SD)</td>
<td>84 (±11)</td>
<td>82 (±11)</td>
<td>86 (±10)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fasting glucose level, mmol/l mean (±SD)</td>
<td>5.6 (±1.2)</td>
<td>5.4 (±0.75)</td>
<td>6.0 (±1.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mean systolic, BP mmHg (±SD)</td>
<td>140 (±30)</td>
<td>120 (±15)</td>
<td>168 (±24)</td>
<td></td>
</tr>
<tr>
<td>Mean diastolic, BP mmHg (±SD)</td>
<td>83 (±17)</td>
<td>73 (±12)</td>
<td>96 (±16)</td>
<td></td>
</tr>
<tr>
<td>Overweight, n (%)</td>
<td>340 (41%)</td>
<td>191 (39%)</td>
<td>142 (41%)</td>
<td>0.456</td>
</tr>
<tr>
<td>Obesity, n (%)</td>
<td>135 (16.3%)</td>
<td>71 (15%)</td>
<td>63 (18%)</td>
<td>0.128</td>
</tr>
<tr>
<td>Abdominal obesity, n (%)</td>
<td>196 (24%)</td>
<td>94 (19%)</td>
<td>102 (30%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>IFG*, n (%)</td>
<td>271 (32.3%)</td>
<td>127 (26%)</td>
<td>141 (42%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not fasting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes, n (%)</td>
<td>40 (5%)</td>
<td>40 (12%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DM possible*</td>
<td>20/825 (2%)</td>
<td>13/486 (3%)</td>
<td>7/339 (2%)</td>
<td></td>
</tr>
<tr>
<td>Hypertension, n (%)</td>
<td>322 (40%)</td>
<td>322 (95%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHO Grade I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade II</td>
<td>135 (16%)</td>
<td>135 (42%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade III</td>
<td>110 (13%)</td>
<td>110 (34%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HT and DM combined, n (%)</td>
<td>23 (3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Difference between negatively and positively screened.

b Impaired fasting glucose.

c 7.1–11 mmol/l+ not fasting.

d n (% of total population, e.g., 77/825).

e n (% of identified hypertensive patients, e.g., 77/322).

The remaining 269 (79%) were considered as treatment-naïve with 83 (31%) aware of their condition but untreated and 186 (69%) diagnosed for the first time.

3.2. Demographic and clinical data on the screened population

Demographic and clinical characteristics of the total population screened are shown in Table 1. Seventy percent of participants were women. The percentages of positively screened individuals were similar in both sexes (men 39%, women 42%). The prevalence of hypertension, diabetes, impaired fasting glucose and overweight as well as abdominal obesity was high in the study population. Individuals positively screened for hypertension and/or diabetes were older and had a higher prevalence of abdominal obesity (30%) and impaired fasting glucose (42%; p < 0.001). However mean BMI was identical in both groups.

Socio-economic and medical baseline characteristics of the study population are shown in Table 2. In total, 269 treatment-naïve individuals were included: 95 were assigned to the control group (A) and 174 to the intervention group (B). Individuals in Group B were further subdivided into 3 intervention subgroups (B1, B2, B3). A total of 8 individuals (3 in the control group 5 in the intervention group) were excluded from the outcomes analysis, having stated the intent to be treated outside the area of investigation (Fig. 1). Applying a threshold of a p-value below 0.1, groups A and B differed in rates of diabetes, IFG, education levels, rates of regular income, grade III hypertension and distance to the health-care facility. Diabetes, grade III hypertension and distance to facility remained significant at a p value of <0.05.

3.3. Main outcome

At 3 months from screening ≥1 return visits were recorded for 70 (27%) of all participants, with ≥2 visits recorded for 41 (16%) participants. Rates of return visits (≥1) were significantly higher in the intervention group 55/169 (32%) than in the control group 15/92 (16%) (p < 0.001; OR 2.4; CI 95% 1.3–4.7). After allowing for covariates that differed with a level of significance of <0.1 between the two groups, the intervention group was still more likely to
return for follow-up (OR 2.9 (CI 95% 1.4–6.0), p = 0.003). In this model none of the covariates showed a significant relation with the primary outcome (Fig. 2a).

In the subgroup of newly diagnosed patients (n = 182) the differences in rates of return visits (≥1) were greater still (intervention group 33%, control group 11%, adjusted OR 3.9 (95%CI 1.6–9.9; p = 0.003)). In treatment-naive participants who were already aware of their diagnosis (n = 87) the intervention appeared to have little effect on return rates (intervention group 30% vs. control group 27%; Fig. 2b). However, overall return rates (intervention- and control groups together) in this subgroup were as high as those for newly diagnosed participants (29% vs. 24%).

3.4. Secondary outcomes

Rates of ≥2 return visits in the two groups were 34 (20%) in the intervention group and 7 (8%) in the control group. p = 0.013 (Fisher's exact test).

The differences in follow up rates among the intervention subgroups (B1, B2, B3) were small and not statistically significant. There was a tendency toward higher rates of follow up in the group where the model was employed in explanation and counseling. In this group, 21 (37%) returned vs. a mean of 17 (30%) in the 2 groups with the PIL. Excluding the relatively small number of diabetic participants (n = 40) from the analysis had no influence on the main outcome (OR 2.4 (CI 95% 1.2–4.5)).

4. Discussion and conclusion

4.1. Discussion

Identifying individuals at risk and translating disease awareness into care-seeking behavior are two corner stones in CV risk prevention. The results of the present small-scale study shows that screening campaigns are a highly efficient way to identify individuals at risk, but modifying behavior remains a major challenge. However, we found that rates of return visits (≥1) within three months after screening positively for hypertension and/or diabetes could be tripled in newly diagnosed individuals with a short communication intervention using an educational tool to explain the diagnosis and its implications for the patient. Subgroup analyses showed a greater difference between the intervention- and control groups among participants who returned ≥2 times. Neither the type of educational tool used (PIL or model) nor the emotional content of the explanations (encouraging or frightening PIL) seemed to matter greatly, though this could also be due to small absolute numbers in the subgroups.

The majority of identified individuals presented with multiple additional CVD risk factors which indicates a large potential benefit from lifestyle interventions and medical treatment (Table 2). However, individuals diagnosed during an optional free screening campaign seemed to be less motivated to return for long-term follow-up than those identified while seeking medical care (for any reason).
Our 16% return rates within 3 months after screening are lower than the 18% retention rates after one year reported from subjects identified in routine consultations in the PLMC program in Cameroon [8]. We attribute this to the fact that screening campaigns detect many individuals with no symptoms who do not consider themselves ill and may not perceive a need to be treated [21]. This would impede the process of change resulting in return for follow up [16].

Although overall return rates were not satisfying, the tested intervention seemed to have a significant impact on the motivation of newly diagnosed participants to come back for follow up visits. In former drop outs, interaction with the healthcare system per se, rather than the communication intervention, appeared to effect an advancement in their process of change. It is also probable that the screening campaign selected for more motivated individuals among those participants with previous knowledge of their condition, which would explain the overall higher return rates in this group.

The greater difference in return rates among individuals having consulted ≥2 times within the 3 months hints at the sustainability of the described impact. While observing the interventions, we had the impression that the educational tool had an influence on staff as well as on participants: staff were reminded of the content of the explanations and the counseling to be given and motivated to explain greater detail. Participants paid greater attention to the explanations when having a picture to look at or a model to touch.

The greatest involvement by staff and participants was observed in the group where the model was used as educational tool: it provoked the liveliest discussions and most questions from participants, ideal conditions for the exchange of concepts that play an important part in motivational counseling. One reason why this greater involvement did not translate into greater differences between the subgroups could have been carry-over effects: as all counselors performed all three interventions, lessons learnt from the model intervention were applied in the other two situations.

Whether screening campaigns are worthwhile depends on the cost and on the purposes for which they are organized. We found free screening a very efficient means to identify untreated individuals (Number needed to screen [NNS] = 3), and moderately so at recruiting participants for treatment (NNS = 20; increased to 10 with our interventions). Auxiliary benefits observed from the campaigns combined with motivational counseling were increased awareness among the rural population, stimulation for former drop-outs to resubmit to treatment and increased motivation of staff. However we did not quantify any of these effects.

Because of the chosen focus on case identification and motivation for treatment, we have no information on the impact of counseling with educational tools on long term follow up or treatment adherence, and even less on preventing adverse outcomes. For such effects to become relevant, a much longer period of observation would have been needed.

The actual-care situation of an optional screening campaign introduced different biases in the screened population: the mean age was higher than in the general population [22] and hypertension was highly prevalent at 41%. Furthermore, many people were not fasting, which restricted the screening for diabetes. The other demographic data are representative of a rural/semi urban Cameroonian population [23]. The small sample size and low overall retention rates limited the statistical power of the study, especially for subgroup analyses.

To assess follow up by searching participants’ names in treatment registers is not very reliable. Retention rates might be under-estimated if consultants omitted to register every consultation or names were not legible. However, this applies to all included participants and would not influence the main outcome.

4.2. Conclusions

Low- and middle-income countries must cope with 5 times the burden of CVD of high-income countries while having access to only 10% of global treatment resources [24]. As these dismal conditions are unlikely to change soon, public-health programs need careful design for maximal impact and minimal cost. We found promising effects on retention rates from improved communication with participants and the use of simple communication aids in a rural primary-care setting in Cameroon. Although the results would need to be confirmed in a larger setting, the strategy is inexpensive and easily applicable. We found screening campaigns to be highly effective at identifying individuals at risk, but they may not represent the most favorable setting for initiating the process of change leading to return for follow up.

4.3. Practice implications

The effectiveness of patient-centered communication and counseling on adherence and health outcomes has been widely recognized for many years [25]. This pilot study suggests that even quite modest communication interventions may bring important returns and increase the effectiveness of public health measures to combat chronic diseases in settings of limited resources.

Appendix A

ON NE PEUT PAS GUERIR CES MALADIES MAIS ON PEUT LES CONTROLEZ EN AGISSANT

Il faut avoir une alimentation saine et équilibrée: éviter trop de viande et trop de graisse

Prendre régulièrement ses médicaments

Eviter l'alcool et le tabac

Respecter les rendez-vous au centre de santé

Avoir une activité physique régulière

References
