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ORIGINAL ARTICLE

Outcomes of the mental health and development model in rural Kenya: a 2-year prospective cohort intervention study

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Background: The aim of this study was to evaluate outcomes for participants in BasicNeeds' Mental Health and Development programme in rural Kenya.

Methods: All new entrants to the programme in the Meru South and Nyeri North districts were enrolled in the study over a 3-month period (n = 203). Assessments of mental health, functioning, economic status and quality of life were conducted at baseline and at 1-year and 2-year follow up, using a single group cohort design.

Results: Over the 2 years there were significant improvements in scores on the General Health Questionnaire (21.5 [95% CI: 20.2–22.8] to 6 [95% CI: 4.8–7.2] $p < 0.01$), Global Assessment of Functioning scale (78 [95% CI: 75.5–80.3] to 94 [95% CI: 90.7–97.3] $p < 0.01$), summed WHO Quality of Life-Brief scale (39.5 [95% CI: 38.6–40.4] to 57.2 [95% CI: 56.2–58.3] $p < 0.01$) and the proportion who were engaged in either income generation or productive work (45.3–64.0%, $p < 0.01$).

Conclusions: The mental health and development model shows improvements in mental health, functioning, income generation and quality of life among people living with severe mental illness in rural Kenya. The findings demonstrate the feasibility and benefits of integrating mental health and poverty alleviation components in mental health care in Africa.

Keywords: Mental Health, Kenya, Mental Health and Development Model, BasicNeeds

Introduction

Mental health is a neglected priority in many low and middle-income countries.[1] There have been several recent international calls to scale up mental health service provision in these countries from WHO and coalitions of researchers, service providers, service users and other stakeholders.[2–4] To assist this scaling up process, there is reasonably good evidence for a range of cost-effective interventions,[5] including interventions in African settings.[6]

However, a key gap is in interventions that have a comprehensive community-based approach to addressing the needs of people with mental health problems living in poverty. The relationship between mental health and poverty in low and middle-income countries is complex and includes both social causation and social drift (or social selection) mechanisms.[7] In relation to social causation, people living in poverty are at increased risk of developing mental health problems through the stress of living in conditions of deprivation, increased risk for trauma and other negative life events, increased obstetric risks, social exclusion and food insecurity.[8–10] In relation to social selection, mental disorders have been associated with increased health expenditure, loss of employment, reduced productivity, stigma and a drift into poverty.[11] These patterns have been termed the 'vicious cycle' of poverty and mental ill-health.[12, 13] To break this cycle, interventions are needed that address mental health needs (through the provision of evidence based treatment and rehabilitation), poverty and social exclusion.[14, 15]

BasicNeeds, an international non-governmental organisation (NGO) has developed a comprehensive 'mental health and development' model for addressing the needs of people living with mental illness in poor communities in low income countries.[16] Established in 2000, BasicNeeds now has 16 programmes in 10 low-income countries and had intervened in the lives of 104 234 people living with mental illness in low resource settings by June 2012 (www.basicneeds.org). The BasicNeeds model

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comprises five separate but interlinked modules, namely: capacity building, community mental health, sustainable livelihoods, research, and management and administration.[17] Each module is implemented as part of a mental health programme, delivered within a defined geographical area which is marked by high levels of poverty. The effect of the programme is hypothesised to be felt through the implementation of all five modules, with goals of both improving the mental health of participants and bringing about a change in levels of poverty.

To date few evaluations of the outcomes of BasicNeeds programmes have been conducted: an evaluation of 138 participants in the BasicNeeds programme in north India found improvements on key economic indicators such as hospital fees, employment status, number of working days missed due to illness and number of caregiver hours.[18] An 18-month cohort study of a similar community outreach programme in north India with 100 participants with schizophrenia, found significant improvements in summary scores for psychotic symptoms, disability and family burden.[19] Increases in treatment and community outreach costs over the follow-up period were accompanied by reductions in costs of informal-care sector visits and family care-giving time.

Little is known regarding the impact of the BasicNeeds programme on mental health status, economic status and quality of life of participants in Africa. Such an evaluation could carry a number of advantages, including the improvement of the ongoing work of BasicNeeds, and an assessment of the feasibility and benefits of extending the BasicNeeds model to other settings, including integration into the programmes of other development agencies and governments.

The aim of this study was to evaluate mental health, economic and quality of life outcomes for participants of BasicNeeds' Mental Health and Development programme in rural Kenya.

Methods

Design, sample and context

A single group cohort intervention design was adopted. All new entrants to BasicNeeds Kenya's rural programme in the Meru South and Nyeri North districts were enrolled in the study during May–July 2009. Meru South (population: 128 107; area: 624km^2) and Nyeri North (population: 324 659; area: 2287km^2) are predominantly rural areas in central Kenya, with very limited mental health service coverage.[20] There is one psychiatric nurse in each district and there are no psychiatrists or psychologists. The wider Meru county (of which Meru South is one of eight districts) has one psychiatrist in private practice and three psychiatric nurses in the Ministry of Health (MoH) services, while the wider Nyeri county (of which Nyeri North is one of seven districts) has two psychiatrists in private practice, one in the state district hospital and three psychiatric nurses in the MoH services. Patients in need of inpatient psychiatric care are referred to the Nyeri provincial general hospital in Nyeri and the Meru district hospital in Meru. Some primary health care staff have received training in mental health care, but due to the high demand of other health needs are unable to devote substantial time to mental health services.

Intervention

The intervention began with community engagement meetings in local villages, conducted by BasicNeeds Kenya staff in collaboration with partner NGOs, with the purpose of mobilizing the community through raising awareness about mental health. At the initial stages three community engagement meetings were held in each district. At these meetings, community members were invited to identify themselves or relatives who might be in need of care. Subsequent meetings were conducted to give participants time to make an informed decision about whether to participate in the project and help those who had decided to start attending for an assessment at the nearest primary care MoH facility. The meetings also created awareness about the formation of self-help support groups for individuals with mental health problems and carers.

Participants were eligible to join the programme if they were adults (age 18 years and older) who were identified by the psychiatric nurse at the clinic as having a severe mental or neurological disorder (such as schizophrenia, epilepsy, bipolar mood disorder or major depression). People assessed by the psychiatric nurse to have moderate to severe intellectual disability or substance abuse as a primary presenting problem were excluded from the study. The community engagement meetings were attended by 1237 people out of which 529 identified themselves as having a mental health problem. Of these, 408 attended the psychiatric clinics, 317 were diagnosed with mental health problems, and 203 qualified to participate in the study as per the above inclusion criteria.

In addition to the community meetings, BasicNeeds facilitated the training of community-based health workers (CBWs). The role of CBWs was threefold: to enable them to identify the symptoms of mental disorders; refer individuals to local primary care psychiatry clinics for assessment and medication management by a psychiatric nurse; and facilitate user self-help support groups. In Kenya CBWs are members of the community identified by the locals and trained in the community in basic health interventions for the purpose of assisting health professionals in MoH clinics. They are recognized in the Kenya Essential Package for Health under the current Kenya National Health Sector Strategic Plan, and typically serve 20 households or 500 persons.

The criteria for the selection of CBWs have been set by the Division of Community Health in the MoH in Kenya. The qualifications include: being a Kenyan Citizen living in the community; being able to read and write; being interested in volunteering; having previous experience in community voluntary work; having a minimum of 2 days per month to dedicate to the community; and having recommendation and support from the local administration.

The opportunity for CBWs to volunteer in the BasicNeeds programme was advertised in the local health facilities and interested persons were asked to give their names at the facility. Twenty five men and women who met the above criteria were recruited to the project. The training included: the concepts of mental health and mental illness; debunking the myths and misconceptions about mental illness; signs and symptoms of mental illness; common mental health conditions; community animation techniques; making a referral; basic counseling skills; instruction on how to complete a home visit form; and motivating

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groups. To facilitate a self-help group in the BasicNeeds programme, a CBW must have completed the 5 days training and held a participation certificate; must practice about three sessions of the group facilitation skills with a development worker from BasicNeeds, a partner NGO or MoH clinics; and have mastered the 10 steps of self-help groups using a standard group formation and development guide.

Subsequent to the community engagement meetings and clinic assessments, participants were invited to join user self-help support groups together with a carer (typically a family member), where they were able to tell of their experience of illness and receive psychosocial support. The self-help support groups were facilitated by CBWs. The user self-help groups were the main vehicle for ongoing support and the introduction of livelihoods programmes such as training in craft, agricultural or business skills, and the initiation of income-generating activities by participants. The groups took three forms: carers only, users only and a combination of carers and users. The main criteria and basis of group formation was that the people in the group should be from the same locality for ease of meeting. These group meetings were held at a central place near their residence such as government health facilities, local administration offices, churches and members' homes. At the initial stages of group formation the members met twice a month (in the first six months of study) but after the groups stabilized (for the rest of the study period) the meetings were held weekly, twice a month or once a month. The duration of the meeting depended on the activities of the day but mainly lasted between 90 mins and three hours. The groups were closed in the sense that only persons with mental illness or carers were allowed to participate. The groups were, however, open to all eligible persons with mental illness or their carers even if they wanted to join the group once it was formed. If the group was already formed to maturity, or had attained the recommended number of between 15 and 25 members, new members were encouraged to form a new group.

Data collection and instruments

Assessments of mental health, economic status and quality of life were conducted on entry to the programme (baseline) and at 12-month and 24-month follow up. All instruments were translated into KiSwahili, Kikuyu and Kichuka, back translated and pilot tested. Pilot testing of the instruments took place with 10 respondents in April 2009, prior to the commencement of fieldwork. We made minor changes to the translated instruments following piloting, to improve face validity. Mental health status was assessed using the General Health Questionnaire 12-item version (GHQ-12).[21] The GHQ-12 was selected, rather than a diagnosis-specific tool such as the Positive and Negative Symptoms for Schizophrenia Scale (PANSS) because of the diagnostically heterogeneous nature of the sample. Functioning was assessed using the Global Assessment of Functioning (GAF) scale.[22] Diagnosis, as recorded by a psychiatric nurse in the clinical files of programme participants, was made during the course of the programme, recorded post-hoc and included in the analysis. An economic status instrument was adapted from a previous study of a community outreach programme for schizophrenia in north India[19] to assess current income, education, occupation, health service utilization and associated costs (including cost of travel to health care) and requirements for care in the home (including lost income of carers), medication used and costs of medication. The 26-item WHO Quality of Life Brief version (WHOQOL –BREF)[23] was used to assess quality of life. Permission was obtained from WHO for the use of this instrument in the study. An intervention checklist, adapted from previous BasicNeeds programme evaluations, was used to identify the various components of the programme that were received by participants during the 2 years of the study.

All interviews were conducted by trained psychiatric nurses and clinical officers. There were six interviewers in total: three in Meru South and three in Nyeri North. In Nyeri North, none of the data collectors were involved in providing the service to programme participants but in Meru South a psychiatric nurse who was treating the participants was also involved in data collection. In order to check on data quality, the BasicNeeds Kenya research officer (MW) checked all completed questionnaires, and re-interviewed a random selection of respondents to verify data reliability. Questionnaires were completed in pen and paper format and retrieved from interviewers immediately after the interview was completed. Interviewers at the 12-month and 24-month follow-ups did not have sight of the individual participants' scores on the outcome measures at earlier time points.

Analysis

Exploratory data analysis included frequency distributions, histograms, scatter plots and partial correlation. Paired t-tests, Wilcoxon signed rank tests and McNemar's χ^2 were conducted to compare outcome measures at each assessment point in addition to the calculation of measures of central tendency and their 95% confidence intervals. The significance level for hypothesis testing was set at $\alpha = 0.05$; p-values were calculated between baseline and 24 months. We sought to identify covariates which were strongly associated with mental health. First, we explored the relationship between these covariates and mental health using bivariate analysis and started to create a single model which included these covariates. Then we fitted a longitudinal model with GHQ-12 score as the dependent variable; age, marital status, previous work, current occupation, income source, marital status, average monthly income, diagnosis and district were the independent variables. We used the method of generalized estimating equations to estimate model parameters. Covariates were entered into the model using a forward stepwise approach. They were included if their p-value was less than 0.05 and they improved the R^2 of the model. We report the final model only. A negative coefficient represents a decrease in GHQ-12 score and was interpreted as a beneficial programme effect on mental health. Data analysis was performed using STATA 10 (StataCorp LP, College Station, TX, USA).

Ethics

Informed consent was provided by the participant or a caregiver if impaired insight and/or judgement rendered it impossible to obtain informed consent from the participant. There were no consequences if a person or their family declined to participate. All recorded information was kept confidential through storage in lockable filing cabinets and password protected computers. All identifying data were removed during the course of the analysis

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and no identifying information was provided in the write-up or dissemination of research findings. In preparation for the study, extensive sensitization and awareness raising activities were conducted with all stakeholders in various meetings. These included government administration officials, district health management teams, communities and the families in the relevant study areas. The research complies with the 2008 version of the Declaration of Helsinki.[24]

Results

At baseline, 203 participants were enrolled in the study (Table 1), comprising 104 from Meru South and 99 from Nyeri North. This was reduced to 192 at 12 months and 174 at 24 months (attrition of 14.3% over 2 years). Reasons for dropout included moving out of the area (10), whereabouts unknown (8), died (8), declined interview (2) and defaulted treatment (1). There were significant differences in dropout between districts: 8/104 in Meru South compared to 21/99 in Nyeri North ($p < 0.01$). Those lost to follow up were not significantly different at baseline with regard to diagnosis, GHQ-12 Score, WHOQOL score, family income, sex, education, marital status, family situation, occupational category, hospital admissions, and use of traditional and faith healers compared to those who were followed up.

By the end of the first year, most participants had received each of the 'core' components of the intervention. These included having received programme information, met programme staff, attended clinics, received a diagnosis, received medication, attended follow-up appointments, attended group meetings, received a work capacity assessment, attended self-help groups, being linked to other organisations and received counseling, and this was sustained at the end of Year 2 (Table 2). At baseline all 203 participants were on medication, at 12 months 192 of 192 participants and at 24 months 123 of 174 participants were on medication. Psychotropic medications that were prescribed included antipsychotics, mood stabilizers, antidepressants, anxiolytics and anticonvulsants.

Over the 2 years there were significant improvements in scores on the GHQ-12 (21.5 [95% CI: 20.2–22.8] to 6 [95% CI: 4.8 – 7.2] $p < 0.01$), GAF scale (78 [95% CI: 75.5–80.3] to 94 [95% CI: 90.7–97.3] $p < 0.01$), summed WHOQOL scale (39.5 [95% CI: 38.6–40.4] to 57.2 [95% CI: 56.2–58.3] $p < 0.01$) and the proportion who were engaged in either income generation or productive work (45.3% to 64.0%, $p < 0.01$) (Table 3).

Table 1. Participant characteristics at baseline

Participant characteristics	Baseline n = 203
Age	35 (IQR 27–46)
Sex	
Male	103 (50.7%)
Female	100 (49.3%)
Diagnosis	
Epilepsy	56 (27.6%)
Schizophrenia	67 (33.0%)
Bipolar Disorder	32 (15.8%)
Depression/Anxiety	21 (10.3%)
Psychosis	17 (8.4%)
Other	10 (4.9%)
Education	
Never been to school	12 (5.9%)
Some primary school	84 (41.4%)
Completed primary school	67 (33.0%)
Completed secondary school	28 (13.79%)
College and above	12 (5.9%)
Marital status	
Unmarried	109 (53.7%)
Married	69 (33.5%)
Divorced	13 (6.4%)
Widow/Widower	13 (6.4%)
Prior Work	
No	125 (61.6%)
Yes	78 (38.4%)
Current Occupation	
None	111 (54.7%)
Productive	69 (34.0%)
Income generating	23 (11.3%)
Income Source	
Casual labour	62 (30.5%)
Family farming	130 (64.0%)
Salaried job	7 (3.5%)
Business (non-farming)	2 (1.0%)
Other	2 (1.0%)
Median monthly family income (Ksh)	700 (IQR 500–1500)

Table 2. Participants' receipt of intervention components

Intervention checklist	Baseline n = 203	12 months n = 192	24 months n = 174
Programme info	162 (79.8%)	189 (100%)	173 (100%)
Met programme staff	171 (84.2%)	189 (100%)	173 (100%)
Attend clinic	197 (97.0%)	189 (100%)	173 (100%)
Diagnosis	181 (89.2%)	188 (99.5%)	173 (100%)
Referred[a]	32 (15.8%)	96 (50.8%)	78 (45.1%)
Referred (other illness)	19 (9.4%)	89 (47.1%)	68 (39.3%)
Meds received	131 (65.2%)	187 (98.9%)	172 (99.4%)
Follow-up	13 (6.4%)	163 (86.7%)	153 (88.4%)
Group meetings	44 (21.9%)	189 (100%)	167 (97.1%)
Assess work capacity	5 (2.5%)	140 (74.1%)	171 (99.8%)
Self-help groups	14 (6.9%)	181 (96.3%)	165 (95.4%)
Other groups	51 (25.1%)	125 (66.5%)	126 (72.8%)
Occupational training	4 (2.0%)	75 (39.7%)	84 (48.6%)
Employment placement	0	0	2 (1.2%)
Loan/credit	1 (0.5%)	5 (2.7%)	9 (5.2%)
Grants	0	103 (54.5%)	173 (92.5%
Link to other organisations	0	133 (70.7%)	164 (94.8%)
Counselling	148 (72.9%)	185 (97.9%)	173 (100%)

[a]Referred for mental health reasons.

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Table 3. Outcomes of the BasicNeeds programme at three time points

Rating scales	Baseline, n = 203	12 months, n = 193	24 months, n = 174	p-value
GHQ[a]	21.5 (20.2–22.8)	12.0 (10.4–13.6)	6.0 (4.8–7.2)	$p < 0.01$
WHOQOL-BREF[b]				
Individual items				
Overall quality of life	2.5 (2.4–2.6)	3.5 (3.4–3.6)	3.8 (3.7–3.9)	$p < 0.01$
Health satisfaction	2.3 (2.2–2.4)	3.5 (3.4–3.6)	3.8 (3.7–3.9)	$p < 0.01$
Domain scores				
Physical health	10.8 (10.6–11.2)	13.3 (13.0–13.6)	14.5 (13.7–14.2)	$p < 0.01$
Psychological	9.7 (9.5–10.0)	11.7(11.4–11.9)	13.9 (14.1–14.7)	$p < 0.01$
Social relationships	9.8 (9.4–10.2)	11.6 (11.3–12.0)	14.4 (14.1–14.7)	$p < 0.01$
Environment	9.1 (8.8–9.4)	12.3 (12.09–12.5)	14.4 (14.1–14.7)	$p < 0.01$
Total	39.5 (38.6–40.4)	48.9 (48.1–49.8)	57.2 (56.2–58.3)	$p < 0.01$
GAF Score[a]	78 (75.7–80.3)	83 (80.3–85.6)	94 (90.7–97.3)	$p < 0.01$
Economic measures				
Median monthly family income (Ksh)[a]	700 (589–811)	1000 (869–1131)	2000 (1821–2178)	$p < 0.01$
Occupational category[c]				
Unemployed	111 (54.7%)	106 (54.9%)	63 (36.0%)	
Productive	69 (34.0%)	55 (28.5%)	78 (44.6%)	
Income generating	23 (11.3%)	32 (16.6%)	34 (19.4%)	$p < 0.01$

GAF: Global Assessment of Functioning; GHQ: General Health Questionnaire; WHOQOL–BREF: WHO Quality of Life Brief version.
[a]Non-normal data: median (95% CI), Wilcoxon signed rank test.
[b]Normal data: mean (95% CI), paired t-test.
[c]Categorical data: number (%), McNemar's test (unemployed vs productive/income generating).
p-values calculated between baseline and 24 months.

Productive work was defined as any work without monetary benefit and included household work, studying or other work without remuneration. However, in relation to change in occupational status, the difference was significant only for men: the proportion of men who were engaged in either income generation or productive work increased from 36.0% to 61.0% ($p < 0.01$), whereas the proportion of women who were engaged in either income generation or productive work increased from 55.0% to only 66.0% ($p = 0.16$).

The Cronbach's alpha was moderate for the GHQ-12 ($\alpha = 0.61$) and good for the WHOQOL-BREF ($\alpha = 0.88$). However, there was wide variation between the sub-domains of the WHOQOL-BREF: Domain 1 (physical health): $\alpha = 0.73$; Domain 2 (psychological): $\alpha = 0.75$; Doman 3 (social relationships): $\alpha = 0.40$; and Domain 4 (environment): $\alpha = 0.82$. Inter-rater reliability could not be assessed as sufficient participants were not measured by different raters at the same time point.

At the family level, the average monthly income increased from a median of 700 Kenyan Shillings (Ksh700) (95% CI: 589–811) to Ksh2000 (95% CI: 1821–2178) ($p < 0.01$) over the 2 years (Figure 1). At 2 years most participants subjectively attributed all or most of their change in job (88.1%) or income status (85.8%) to participation in the programme.

In the general estimating equation model (Table 4), time on the programme was significantly associated with a decrease in GHQ scores between baseline and year 2 (ß= −7.50, $p < 0.01$; significant regardless of diagnosis and a range of other variables). This means that for every year on the programme, holding other variables constant, a participant's GHQ-12 score decreased by 7.50 (out of 36). Similarly, whether the participant had ever worked prior to joining the programme (ß= −2.32, $p < 0.01$) resulted in an improved GHQ-12 score over the length of the programme as did whether the participant engaged in productive work (ß= −1.48, $p = 0.01$) or income generating work (ß= −3.17, $p < 0.01$), compared to being unemployed during the course of the 2 years. The latter variable was significant regardless of diagnosis. A diagnosis of schizophrenia (ß= 1.72, $p < 0.01$) or bipolar disorder (ß= 2.92, $p < 0.01$) significantly decreased the likelihood of an improvement in GHQ score, compared to epilepsy. The district in which the programme was implemented was also significantly associated with differences in GHQ-12 scores (ß= 9.40, $p < 0.01$). Change in GHQ scores was not associated with age, education, marital status, family situation, or use of traditional or faith healers.

There was a significant reduction in the proportion of participants who reported receiving help from carers in the home, from 37.0% at baseline to 8.0% at 12 months, and 7.5% at 24 months ($p < 0.01$). There was also a significant reduction in the proportion of participants who reported that their carers in the home left their jobs to care for them from 13.8% at baseline to 2.0% at 12 months, and 0.6% at 24 months ($p < 0.01$).

Discussion

To our knowledge, no studies have yet evaluated mental health, functioning and economic outcomes of a mental health

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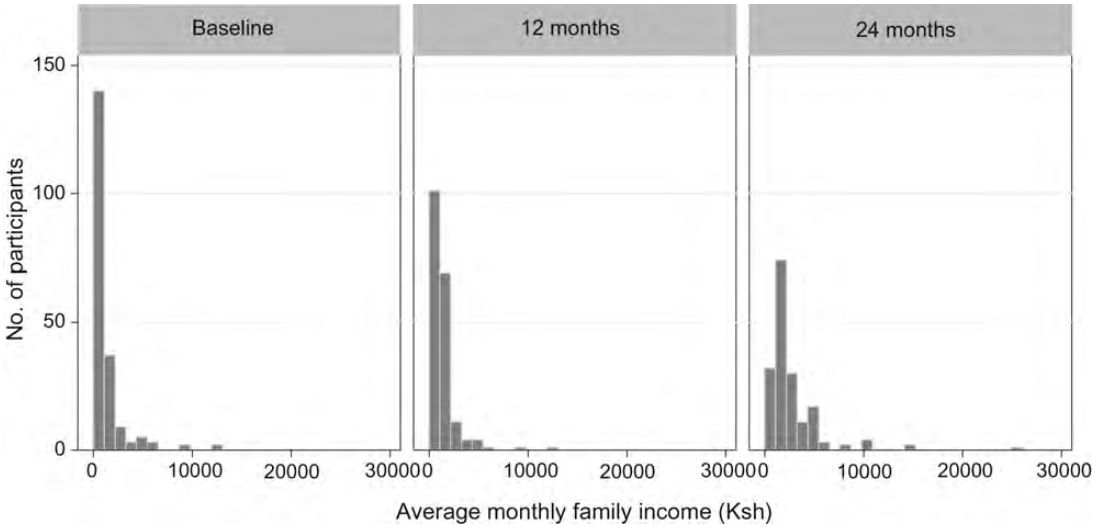

Figure 1. Average monthly family income at baseline, 12 months and 24 months.

Table 4. Variables associated with change in GHQ-12 score over time: results of the general estimating equation model

	Co-efficient	p-value	95% CI	
			Lower	Upper
Years on programme	−7.51	<0.01	−7.99	−7.03
District	9.40	<0.01	8.40	10.40
Prior work	−2.33	<0.01	−3.17	−1.48
Diagnosis (compared to epilepsy)				
Schizophrenia	1.72	<0.01	0.64	2.79
Bipolar disorder	2.79	<0.01	1.55	4.30
Depression/anxiety	0.79	NS	−0.86	2.44
Psychosis	0.17	NS	−1.66	2.01
Other	0.16	NS	−1.79	2.14
Occupational category (compared to unemployed)				
Productive work	−1.47	0.01	−2.37	−0.58
Income generating	−3.17	<0.01	−4.37	−1.97
Constant	18.59	<0.01	17.50	19.68

NS: non-significant

programme that includes mental health, social support and poverty alleviation aspects in Africa. This study fills this gap by evaluating the outcomes of a cohort of people living with severe mental illness in circumstances of poverty who participated in BasicNeeds' Mental Health and Development programme in rural Kenya. The programme is novel in that it provides access to much needed psychotropic medication, and simultaneously enrolls participants in self-help support groups. Together with carers, participants are encouraged to share their life stories, build a network of support and subsequently develop skills to participate in income generating activities or other productive work. Our findings present compelling evidence that not only are such programmes feasible, but they lead to significant improvements in mental health, quality of life, social functioning and economic activity. The validity of the findings is supported by the consistency of improvements across domains (convergent validity), and the effect of time in the programme on GHQ-12 scores even when controlling for all other variables, which seems to indicate a dose-response relationship. The benefits shown by the outcome measures are confirmed by the self-reported attributions of participants.

In addition there seems to be evidence that these benefits are extended to the household, with increases in median family income over the course of the study. This is consistent with other findings regarding household economic benefits of mental health interventions in low and middle-income countries[14] a finding which may be partially attributed to improved economic functioning of participants, but also may reflect reduced caring roles for family members who are consequently able to take on income generation for the household. This latter hypothesis is supported by our findings regarding substantially decreased reliance on household caregivers in this sample, and reduced job loss among household caregivers. This may shed light on the importance of the household when considering the causal relationship between mental illness and poverty. Interventions that provide care and support to people with mental illness and thereby reduce family caregiver burden may play an important role in assisting households to lift themselves out of conditions of extreme poverty, for example through increasing the economically productive role of caregivers.

Caution is required in attributing the change in outcomes to any one component of the programme (such as psychotropic medication), as it is impossible within the current design to determine whether changes are attributable to this or other components such as economic empowerment or social inclusion. Indeed, the findings regarding factors associated with improvements in GHQ scores indicate the strong influence of income generation and productive work on mental health outcomes in this study. This was indicated as both a protective factor on

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entry to the programme (participants who had worked at some time prior to enrolling in the programme were more likely to show improvement on GHQ scores), and an outcome of the programme itself (participants who became engaged in income generation and productive work were more likely to show improvement on GHQ scores).

Thus, in terms of the cyclical relationship between poverty and mental illness, described in the introduction to this paper, the multi-component BasicNeeds programme may be simultaneously acting on both social causation and social selection/drift mechanisms, to yield the changes observed in this cohort. It is interesting to note the decreased reliance on psychotropic medication by members of the cohort over the 2 years of the programme, which seems to point to the role of the social inclusion and economic empowerment components acting on the social causation pathway, although further research is needed to confirm this hypothesis.

Of interest is the significant difference in GHQ-12 outcomes between districts. Meru South had significantly better GHQ-12 outcomes and significantly lower drop-out rates than Nyeri North, indicating possible differences in programme fidelity and quality between the districts.

Of potential concern is the significant reduction in support from carers in the home. While this may indicate increased autonomy, it may also reflect increasing reliance by families on the programme, which may not be sustainable if funding for the programme is removed. This concern may be partially ameliorated by evidence that the programme delivers treatment and livelihoods interventions, while simultaneously building capacity and mobilizing a range of local community resources. These include users and carers gaining access to treatment and income generation; health providers receiving training; and community stakeholders increasing awareness and involvement. In this sense, the reduction in dependence may be broader than simply between the affected individual and his/her carer. Further research is required to shed more light on this question.

The study has a number of limitations. Firstly, for ethical and practical reasons we were not able to include a control group in the study. A control group would have involved case identification of people with severe mental illness and then withholding treatment and other aspects of the programme, in circumstances where there are few alternative opportunities for care. Nevertheless, given evidence for the negative outcomes for untreated conditions such as epilepsy, schizophrenia and bipolar disorder (which make up the majority of our cohort) in low and middle-income countries[25] we believe that our study provides reasonably convincing evidence of positive outcomes that may be attributed to this programme, across a number of domains. Secondly, we encountered some challenges with instrumentation. These are reflected in the moderate internal consistency (Cronbach's Alpha) for the GHQ-12 and low internal consistency of one sub-domain of the WHOQOL-BREF. This may have negatively influenced the overall reliability of the findings. Thirdly, to our knowledge the criterion-related validity of key outcome measures such as the GHQ-12, the GAF and the WHOQOL-BREF is not known in Kenya,[26] although all have been widely used internationally, including in African settings, and there appears to be some evidence of convergent validity and face validity of these measures in this study. Nevertheless further research is required to assess the validity of these measures in the local setting. Fourthly, one fieldworker (a psychiatric nurse) was also involved in providing care as part of the MoH services in the Meru South district and this may have influenced his capacity to provide impartial assessments of the outcomes.

There are a number of potential avenues for future research. These include economic evaluation of costs and outcomes for single group cohort studies; randomised controlled trials of mental health and development interventions in low resource settings, including economic evaluations; and qualitative evaluations of the experience of people living with mental disorders who participate in programmes of this nature.

The study findings highlight a number of policy recommendations. Firstly, the scaling up of mental health services in low and middle-income countries[2] need to include an economic empowerment and social inclusion component. This component can have a substantial impact on clinical outcomes, functioning, quality of life and economic outcomes for people living with severe mental disorders in conditions of poverty. Adopting an integrated approach to provision of care, recovery and economic empowerment is possible in low resource settings, as shown in the BasicNeeds programme in rural Kenya. The approach of task shifting, recommended elsewhere[27] appears to work well in this context, through the use of CBWs to facilitate user self-help support groups and provide psychosocial support. Furthermore, it is possible to evaluate these interventions in low resource settings, and such evaluations should be integrated into routine services where possible.

Authors' contributions: CL, JK and SR designed the study; CL, JK, SKW and MW conducted the pilot testing; MW and JK supervised the data collection; MW, SKW and SM conducted the data checking and cleaning; EB conducted the analysis in consultation with CL; CL drafted the manuscript; and all authors made substantial contributions to the manuscript and approved the final version. CL is guarantor of the paper.

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