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Basic income – healthy outcome?

Effects on health of an Indian basic income pilot project:
a cluster randomised trial

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Abstract

This article evaluates the effects on health of a basic income (BI) pilot project in Madhya Pradesh, India, between 2011 and 2012. BI can be defined as a non-contributory, universal, and unconditional cash transfer paid out on an individual basis. The project was conducted as a cluster randomised trial involving 2034 households. Three health outcomes were examined: minor illnesses and injuries, illness and injuries requiring hospitalisation, and child vaccination coverage. The data was analysed with multiple imputation, propensity score matching, and weighted logistic regression. BI was seen to significantly reduce the odds of minor illnesses and injuries by 46 per cent. No effect was seen on more serious illnesses and injuries, at least not in the time scale given, nor on child vaccination coverage which was already exceptionally high. Policy makers are encouraged to consider BI as an equitable policy of social protection, though further research on its impact on health is desirable.

Keywords: *basic income; cash transfer; social protection; cluster randomised trial; propensity score.*

1. Introduction

1.1. *Social determinants of health*

The social determinants of health provide a framework with which it can be explained how some individuals and societies attain satisfactory levels of health while others do not. The health divide between acceptable and unacceptable health, both within and between societies, is huge, and neither random chance nor individual factors alone are sufficient to explain it. Health follows a social gradient whereby socio-economic status and health are directly linked in an almost linear relation (CSDH 2008; Burns 2012; Marmot Review 2010; MTFHI 2008). Differences in population health are systemic. They are structurally driven by social and economic policies, national and global, that create and influence the conditions in which people live their lives. Consequently, detrimental daily living conditions, and the resultant ill health, are seen to be unavoidable. Being unavoidable, they are unjust (CSDH 2008). From a social determinants of health perspective, the goal of health equity through social justice is therefore central (Marmot Review 2010).

Social protection, that is, the provision of services such as cash transfers, education, minimum labour standards, and healthcare (CSDH 2008), is a means to social justice in fulfilling the human right to an adequate standard of living (article 25(a), UN 1948). It also brings better health. It has been seen, in a high income country context, that countries with more comprehensive social protection policies do better in comparisons of health indicators. This is not least true with regard to income protection - the provision of income security to individuals at times in their lives when they are most in need and vulnerable (Lundberg et al. 2007). Since vulnerability can occur and does occur at any stage of life (due to young age or old age, responsibilities of caring for family members, disability, illness, or sudden loss of earned income), access to social protection is a necessary requirement throughout the

course of life (CSDH 2008).

1.2. Basic income

A basic income (BI) can be defined as a regular income given unconditionally, universally, and individually, paid out by a political establishment. It is unconditional in not requiring labour in exchange nor being means tested, and is universal and individual in that it is paid to every single member of society (van Parijs 2003). BI is not necessarily enough to cover all basic needs but for most supporters of BI, the ideal is that it would. As a result, much of the existing benefits, transfers, and tax reductions could be replaced or simplified (Birnbaum 2013). BI, or variations thereof, have been repeatedly suggested by a number of notable thinkers throughout the last few centuries as a model of social and economic reform. Today, BI is once more gaining influential ground and is the focus of a wide international grassroots movement, partly driven by the desire to see realised an alternative to extensive public spending cuts and austerity measures, which increasingly jeopardise social inclusion. In Europe, support for the implementation of a BI at both national level and across the whole union is strong, with campaigns and petitions collecting tens of thousands of signatures (Forget, Peden, and Strobel 2013).

Basic income rests firmly on ideas of social justice according to Birnbaum (2013), both from the standpoint of equal opportunities and of social and political equality. The unequal distribution of opportunities in the world can be seen to be based more on circumstance, chance or luck (being born into a certain family, class, society and country) than individual characteristics of inclination toward work and effort. BI is a way to offset this unfair randomness and encourage equal opportunities. Social and political equality, it is hoped, would be fostered through economic security, a base on which self-respect may grow. Having security, individuals may more easily remove

themselves from unfair power relations or authoritarian structures, thus challenging roles of subservience and dominance, and promoting equality in social relations. People would be able to participate in society and express themselves freely without undue humility.

BI has only been tested on a limited scale so evidence of its effectiveness is lacking. More generally however, cash transfer (CT) programmes, of which BI can be considered a type, have in the past two decades increasingly been used in low and middle income countries with promising results. A growing body of evidence highlights successes in tackling poverty (Fiszbein and Schady 2009; Barrientos and DeJong 2006; Barrientos and Lloyd-Sherlock 2003), improving outcomes of health, nutrition, child development, and education (Ranganathan and Lagarde 2012; Robertson et al., 2013 Fernald, Gertler, and Neufeld 2008; Kenya CT-OVC Evaluation Team 2012; Baird, McIntosh, and Özler 2011), and stimulating local enterprise and economy (Covarrubias, Davis, and Winters 2012; Haushofer and Shapiro 2013; Yablonski and O'Donnel 2009; DeMel, McKenzie, and Woodruff 2008). It seems plausible then that BI could also lead to beneficial outcomes.

CT programmes vary considerably in design, and many arguments for and against various aspects of design have been discussed. Two aspects, featuring most prominently in debates on the matter, and of particular importance to BI, are targeting and conditionality. Most CTs aim to target the poor, or a subset of the poor, but may be either conditional (CCT) or unconditional (UCT), where conditionality can be defined as behavioural requirements placed on the recipient in order to receive the cash (Forget, Peden, and Strobel 2013). BI, on the other hand, is specifically non-targeted (that is, universal) and unconditional. A main reason for non-targeting is to reduce costs for both provider and recipient. As explained by

Samson (2009), administrative costs of means assessment and continual reassessment are removed; recipients' costs in time and money are less when there is no need to fill in paperwork, travel to and from government offices, and spend time in queues; social costs of stigma are avoided since a targeted approach may actually reinforce marginalisation. Another reason for non-targeting is that it is free of the potential poverty or unemployment trap of means-tested benefit programmes, whereby it is not economically advantageous to take low-paid employment and risk losing the benefit (van Parijs 2003). Targeting relies on a defined poverty-line which is always arbitrary to some degree, leading unavoidably to inclusion and exclusion errors, and those at risk of falling into poverty are not protected. Non-targeting circumvents these issues and works preventively (Standing 2012). Lastly, non-targeting may be politically strategic if a social protection programme is to be sustainable in the long term: in including not only the poor but all of a society, the support of a broader majority can be expected (Samson 2009).

The case for unconditionality relates closely to ideas of social justice: the poor know best what their needs are and can prioritise and allocate funds as they themselves see fit (Hulme, Hanlon, and Barrientos 2010), thus promoting social equality. Conditions on the other hand, paternalistic by definition (Standing 2012), reinforce social roles of inferiority. Unconditionality is also more in line with a rights based approach to social protection (Forget, Peden, and Strobel 2013); indeed, the right to an adequate standard of living, cited above, is unconditional and applies to all. When conditions are enforced, recipients who do not fulfil them are denied transfers. Often these are those most in need and vulnerable, defeating the very purpose of poverty reduction (Samson 2009). Since they focus on behaviour, conditions can be seen to apportion blame on the poor for their predicament (Hulme, Hanlon, and Barrientos 2010), and while there certainly exists association between poverty and many types of harmful

behaviour (Forget, Peden, and Strobel 2013), poverty is less dependent on behaviour than on the structural factors that lie behind it (Samson 2009). In addition, conditional programmes can be expensive and inefficient with regard to compliance monitoring (Standing 2012; Samson 2009) and introduce the risk of corruption (which has been documented) when administrators have considerable powers in assessing whether conditions are met (Hulme, Hanlon, and Barrientos 2010).

1.3. The Indian context

India has seen high economic growth in the last six decades, with gross domestic product (GDP) growing annually by 6.9 per cent in the last two. Concurrently, income per capita has increased fivefold, poverty has declined along with infant mortality, life expectancy has risen and educational status improved. In spite of this, poverty levels are still incredibly high (42% of the total Indian population measured with a poverty line of US\$ 1.25/day, or 75% with US\$ 2/day, in 2005), and education and skills levels generally low. Nutritional status, in particular among children and women, is poor, and inequalities between regions, and groups and classes in society are wide. Considering the economic growth rate, improvements seen in human development have taken place painstakingly slowly (Srivastava 2013). In not utilising its powers of redistribution to accelerate poverty reduction and human development, the Indian government is under criticism (Drèze and Sen 2013; Kohli 2012).

The workforce in India is made up of a predominant informal sector (mostly in agriculture) and a smaller formal sector. A high degree of informality means that social protection for workers is low and providing it difficult (Srivastava 2013); in this context, contributory social insurance schemes are not applicable (Standing 2012). India does have numerous social protection programmes, however, covering a wide scope: health, education, housing, employment security, and food security (Srivastava

2013), but they have not had the impact on poverty reduction as hoped. Programmes have been riddled with problems, such as frequent redesign and adjustment, poor implementation, lack of flexibility in meeting recipients varying needs, and limited coherence between programmes (World Bank 2010). In order to evaluate the potential of BI as a complementary form of social protection and in reducing poverty, a BI pilot project was conducted in rural India between 2011 and 2012. Using data collected from the project, the present study aims to examine the effect on health outcomes of BI.

2. Methods

2.1. Design

The BI pilot project was conducted by SEWA (Self Employed Women's Association, an Indian trade union that represents poor women in self employment) and funded by UNICEF. The project was carried out in the Indore district of the state of Madhya Pradesh, India, where SEWA is active. A cluster random sampling design was adopted with villages as primary sampling units and households secondary (SEWA 2013). The sample size was calculated based on the formula given by Kelsey, Whittemore, Evans and Thompson (1996) and multiplied by a design effect of 2.5. This design effect was chosen so as to be on the safe side considering the lack of information about the intra-cluster correlation. Assuming a 95 per cent significant level, 80 per cent power, and a 10 per cent reduction in health outcome (50% prevalence in the intervention group), 389 households per group were required. Considering also a five per cent loss to follow-up, a total sample of 2042 households was obtained. Eight villages randomly selected as intervention and 12 villages as control gave a total of 2034 households. In total, 11,688 individuals were involved. All villagers from the intervention villages received a monthly BI, while no one in the control villages did (SEWA 2013).

The intervention lasted 12 months, from June 2011 to May 2012. During this time, every adult received 200 Indian rupees (INR) per month and every child below 18 years of age 100 INR per month. Money for the children was transferred to the mother. The amounts were calculated to equal approximately 25-30 per cent of a poor family's income: a supplement large enough to assist in covering basic needs and improve living standards although not enough to provide total security (Davala, Jhabvala, Kapoor, and Standing 2014). Cash was paid to a bank account and assistance given to those who needed in opening one. During the first three months

some transfers were given cash-in-hand, until such time that everyone had a personal account. No instructions or recommendations on what to spend the money were given, nor were any conditions imposed. Only individuals actually residing in the villages were included. Those who moved into the intervention villages after start were not included, although babies born during the project period were. Those who permanently left their village of residence were excluded (SEWA 2013).

Surveys were carried out at three different times: before the start of intervention (baseline survey – BLS); approximately eight months into the intervention (interim evaluation survey – IES); and after the end of the intervention (final evaluation survey – FES). The surveys contained questions on a wide range of issues: health, sanitation, schooling, labour, financial inclusion, income and expenditure, obligations, organisational involvement, and attitudes on social protection in India. The surveys were conducted at household level, but individual data for some variables were also collected (SEWA 2013). The BLS was carried out by a contracted third party which unfortunately led to unsatisfactory results. Lack of formal training and supervision of the enumerators led to missing values in the data as well as the misplacement of approximately 25 per cent of the filled-in questionnaires. Subsequent surveys were carried out more stringently, organised by researchers within the project, and the enumerators were given proper training (Davalala, Jhabvala, Kapoor, and Standing 2014). Two respondents for each household, one female and one male, were interviewed together when answering the survey (Standing 2013).

Ethical considerations were discussed at a series of workshops during the year prior to the launch of the project. Discussions focused on informed consent, the ethics of the project design, and appropriate exit strategy. In addition to UNICEF and SEWA, external organisations present at these workshops included: Department for

International Development (DFID), World Bank, Planning Commission of India, National Advisory Council of India, and Ministry of Finance. Informed consent was collected in a number of steps: while still in the planning stages of the project, meetings were held in the villages to assess support for the idea; just prior to the project's implementation, so called 'awareness days' were held in each village, during which details were explained and questions answered; and finally, before answering surveys, respondents were informed of their freedom to participate or not (Davala, Jhabvala, Kapoor, and Standing 2014). Trials should only be conducted where there exists a state of equipoise, that is, inconclusive knowledge about the benefits and risks of a treatment (Aschengrau and Seage 2014). While there exists evidence of the beneficial effects of cash transfers schemes, concerns remain about unexpected harmful consequences, such as reducing labour market participation, increasing the consumption of bads, or increasing intimate partner violence. Therefore the design of giving money to some and withholding from others was considered ethically acceptable. Villagers had been made aware that the money would stop after one year, but most wanted to proceed anyway. In actual fact, more money became available at the end of the project year and payments continued for another five months. SEWA made a commitment to increase its efforts in the project villages where it was already established and to enter into and start providing support in all other project villages post-intervention. Follow-up focus group discussions were held to assess how villagers felt about the project in retrospect and how they were coping after it had ended (Davala, Jhabvala, Kapoor, and Standing 2014). The present authors were not involved in the project.

2.2. Data

Data from both BLS and FES were used, but due to the BLS dataset being incomplete the majority of covariates were taken from FES. For clarity, the few covariates from

BLS are here labelled so.

Three dichotomous health outcome variables were created from the FES dataset: any case or cases of illness or injury in the household that lasted more than 24 hours and needed treatment but not hospitalisation in the preceding three months; any case or cases of illness or injury in the household that required hospitalisation in the preceding twelve months; and complete child vaccination coverage, that is, whether all children in the household between the age of six months and five years had been vaccinated, receiving all vaccination doses, against bacillus calmette guerin (BCG), diphtheria, pertussis, and tetanus (DPT), oral polio, and measles, mumps, and rubella (MMR). Immunisation cards were checked when there was uncertainty. These variables are hereafter named *illness/injury*, *hospitalisation* and *complete child vaccination coverage* respectively.

Covariates were related to either general demographics, income, or health. General demographic covariates (all from FES) included: *gender of household head*, *education level of household head*, *number of household members*, *adults over fifty*, *children under fifteen*, *children under five*, *caste*, and *religion*. The first two were considered suitable measures of gender and education level respectively for household level analysis. Education level comprised four categories: none/pre-primary, primary, secondary, and university/vocational. *Number of household members* represented the number of individuals living in the household. *Adults over fifty*, *children under fifteen*, and *children under five* represented the number of individuals in the household in each respective age category. *Caste* comprised four categories: scheduled tribe, scheduled caste, other backward class (OBC), and general, which are the official categories used by public authorities in India. *Religion* referred to the main religion in the household, and in this trial amounted to only two categories: hindu and muslim.

Variables of income from FES included: *household monetary income*, *income sufficient for food needs*, *income sufficient for other needs*, *other financial assistance*, *possession of above poverty line (APL) ration card*, *possession of below poverty line (BPL) ration card*, *possession of antyodaya anna yogana (AAY) ration card*, and *income sharing*. *Household monetary income* was the total amount of money in Indian Rupees (INR) the household received from all sources in the preceding calendar month, grouped into six categories: <1000, 1000<2000, 2000<5000, 5000<10,000, ≥10,000, and not known. The two variables on income sufficiency were subjective measures of whether the previous month's income was firstly, sufficient for food needs and secondly, sufficient for other needs such as clothing, housing, and healthcare after food had been bought. *Other financial assistance* referred to whether households received financial assistance from local authorities, religious bodies or non-governmental organisations (NGO). Ration card possession was represented by three separate variables since it is possible to own more than one type. Those eligible for AAY (for those most poor) can also possess the more general BPL (below poverty line). *Income sharing*, also a subjective measure, represented whether income was shared equally or if one or more members received and spent more than others. Since the intervention itself was a manipulation of income, and because income sufficiency may be subject to seasonal variations, income variables from baseline were also included: *household monetary income (BLS)*, *income sufficient for food needs (BLS)*, and *income sufficient for other needs (BLS)*. These were identical in description to the similarly named variables from FES.

Health covariates (all from BLS) included: *illness/injury (BLS)*, *hospitalisation (BLS)*, *disability (BLS)*, and *chronic illness (BLS)*. The first two were identical in description to the similarly named health outcome variables described above with the exception that *illness/injury (BLS)* had as its time period of reference the previous one month, not three. *Disability* and *chronic illness* represented respectively any case or cases in

the household of disability or chronic illness that interferes with activities of daily living.

2.3. Analysis

The data were analysed with STATA version 12. Cross-tabulation and chi-square tests were performed on all covariates against the study arm variable to check for association and balance of distribution between the arms. Since the BLS dataset was incomplete, which could lead to biased results particularly if confounding variables have missing data, multiple imputation was carried out. Multiple imputation is a method of estimating and filling in missing values of multiple variables in a dataset, and which preserves the correlations between these variables (de Waal, Pannekoek, and Scholtus 2011). Five sets of imputed BLS variables were created and the resulting distributions of these covariates compared with the distributions in the original dataset.

To minimise potential bias due to imbalance in distributions of covariates between study arms (a consequence of cluster randomisation), propensity score matching (PSM) was performed. In this analysis, intervention cases are matched to control cases by way of their propensity score such that they share similar values on all covariates, and differ only with respect to study arm variable, thus effectively mimicking a randomised control trial (Oakes and Johnson 2006). Propensity scores were calculated for all five imputed datasets, using multivariable logistic regression on all covariates (except *religion*, since there were only two Muslim households in the intervention group). Average propensity scores from the propensity scores of each dataset were then calculated. Termed the *across* approach of calculating propensity scores with multiply imputed datasets, this was found to be the preferred method in a statistical simulation study by Mitra and Reiter (2012). The distributions of

propensity scores between the study arms were assessed to check matching suitability. Matching was done with a specified caliper of 0.01, meaning that matched pairs would not differ by more than 0.01 in propensity score (a value between zero and one). Replacement of controls was allowed, therefore some control cases were used more than once in matching. Each case was assigned a weight according to the number of times it had been matched; for intervention cases this was always one. The matched data were then pooled into intervention and control groups and a weighted logistic regression of each of the three health outcomes carried out; cases were counted in the regression as many times as their assigned weight. Stuart (2010) recommends using matching and regression methods in combination, and explains that pooling of matched data as opposed to using individual matched pairs is a relevant strategy. By way of sensitivity analyses, PSM was also carried out on the original unimputed dataset, first excluding any baseline variables and then with all covariates minus the cases with missing data. Weighted logistic regressions were then done on the matched subsets.

3. Results

Of 23 demographic characteristics tested, 8 showed significant differences between the study arms (Table 1). These were *caste*, *religion*, *household monetary income*, *income sufficient for food needs*, *income sufficient for food needs (BLS)*, *income sufficient for other needs*, *possession of APL ration card*, and *income sharing*. Most anomalous was the variable *religion* with 16.6 per cent Muslim households in the control group and only 0.2 per cent Muslim households in the intervention.

Table 1 Demographic characteristics of households in intervention and control groups

		Intervention		Control	
		<i>n</i>	%	<i>n</i>	%
Number of households		938	100	1096	100
Number of household members	2-4	122	13.0	174	15.9
	5	188	20.0	196	17.9
	6	174	18.6	226	20.6
	7	159	17.0	176	16.1
	8	95	10.1	123	10.7
	≥9	200	21.3	201	18.3
Adults over 50	None	387	41.3	506	46.2
	1	255	27.2	285	26.0
	2	254	27.1	273	24.9
	≥3	42	4.5	32	2.9
Children under 5	None	594	63.3	680	62.0
	1	218	23.2	250	22.8
	2	95	10.1	132	12.0
	≥3	31	3.3	34	3.1
Children under 15	None	210	22.4	268	24.5
	1	198	21.1	210	19.2
	2	280	29.9	282	25.7
	3	139	14.8	172	15.7
	≥4	111	11.8	164	15.0
Gender of HH	Female	121	12.9	115	10.5
	Male	817	87.1	981	89.5
Education level of HH	None / pre-primary	463	49.4	555	50.6
	Primary	339	36.1	394	35.9
	Secondary	114	12.2	121	11.0
	University / Vocational	22	2.3	26	2.4
Caste **	Scheduled caste	176	18.8	321	29.3
	Scheduled tribe	111	11.8	124	11.3
	OBC	562	59.9	378	34.5
	General	89	9.5	273	24.9
Religion **	Hindu	936	99.8	914	83.4
	Muslim	2	0.2	182	16.6

HH = household head; OBC = other backward class; * = p-value < 0.05; ** = p-value < 0.01;

Table 1 (cont.) Demographic characteristics of households in intervention and control groups

		Intervention		Control	
		<i>n</i>	%	<i>n</i>	%
Household monetary income (INR / month) **	<i><1000</i>	56	6.0	78	7.1
	<i>1000<2000</i>	70	7.5	100	9.1
	<i>2000<5000</i>	241	25.7	286	26.1
	<i>5000<10,000</i>	327	34.9	304	27.7
	<i>≥10,000</i>	219	23.3	307	28.0
	<i>Not known</i>	25	2.7	21	1.9
Income sufficient for food needs (BLS) *	<i>More than sufficient</i>	115	16.9	101	14.3
	<i>About sufficient</i>	431	63.2	428	60.6
	<i>Insufficient</i>	108	15.8	127	18.0
	<i>Don't know</i>	28	4.1	50	7.1
Income sufficient for other needs *	<i>More than sufficient</i>	23	2.5	25	2.28
	<i>About sufficient</i>	662	70.6	771	70.4
	<i>Insufficient</i>	131	14.0	113	10.3
	<i>Don't know</i>	122	13.0	187	17.1
Income sufficient for other needs (BLS)	<i>More than sufficient</i>	78	11.7	66	9.9
	<i>About sufficient</i>	360	54.2	345	51.7
	<i>Insufficient</i>	150	22.6	164	24.6
	<i>Don't know</i>	76	11.4	92	13.8
Other financial assistance	<i>Yes, from local authority</i>	3	0.3	7	0.6
	<i>Yes, from religious body</i>	31	3.3	40	3.6
	<i>Yes, from NGO</i>	5	0.5	0	0.0
	<i>No</i>	856	91.3	1009	92.1
	<i>Don't know</i>	43	4.6	40	3.6
Possession of Ration Card	<i>AAY (Antyodaya Anna Yojana)</i>	41	4.4	57	5.2
	<i>BPL (Below Poverty Line)</i>	240	25.6	28.7	26.2
	<i>APL (Above Poverty Line) **</i>	599	63.9	637	58.1
Income sharing **	<i>Shared equally</i>	500	53.3	418	38.2
	<i>Men take more</i>	333	35.5	500	45.7
	<i>Women take more</i>	74	7.9	137	12.5
	<i>Other</i>	20	2.1	28	2.6
	<i>Don't know</i>	11	1.2	12	1.1
Illness / injury (BLS)	<i>Yes</i>	229	30.6	201	26.2
	<i>No</i>	519	69.4	567	73.8
Hospitalisation (BLS)	<i>Yes</i>	233	31.1	261	34.0
	<i>No</i>	515	68.9	507	66.0
Disability (BLS)	<i>Yes</i>	101	15.8	86	13.5
	<i>No</i>	537	84.2	553	86.5
Chronic illness (BLS)	<i>Yes</i>	205	33.2	178	28.9
	<i>No</i>	412	66.8	438	71.1

* = p-value < 0.05; ** = p-value < 0.01;

The baseline covariates before and after imputation shared similar distributions (Table 2).

Table 2 Characteristics of baseline variables before and after imputation

		Original dataset % ¹	Imputed datasets (n=5) Average %
Household monetary income (BLS) (INR / month)	<i><1000</i>	63.4	63.5
	<i>1000<2000</i>	9.2	9.0
	<i>2000<5000</i>	16.9	17.0
	<i>5000<10000</i>	4.5	4.5
	<i>≥10,000</i>	6.0	6.0
Income sufficient for food needs (BLS)	<i>More than sufficient</i>	15.6	15.6
	<i>About sufficient</i>	61.9	61.2
	<i>Insufficient</i>	16.9	17.0
Income sufficient for other needs (BLS)	<i>More than sufficient</i>	10.8	11.7
	<i>About sufficient</i>	53.0	51.5
	<i>Insufficient</i>	23.6	23.7
Illness / injury (BLS)	Yes	28.4	28.2
Hospitalisation (BLS)	Yes	32.6	33.0
Disability (BLS)	Yes	14.6	15.4
Chronic illness (BLS)	Yes	31.1	30.4

¹ Percentages calculated after removal of missing values

The mirror-like distributions of propensity scores for the two study arms (Figure 1) indicated good possibilities for matching.

Figure 1 Distributions of propensity score for intervention and control groups.

The odds of any case of illness or injury in the household, needing treatment but not hospitalisation, was 46 per cent less in the intervention arm than in the control arm. No statistical significance was seen for health outcomes related to hospitalisation and complete child vaccination coverage (Table 3). The sensitivity analyses returned similar odds ratios to the main results with overlapping confidence intervals (see Appendix 1).

Table 3 Odds ratios of health outcomes in study arms

	Intervention	Control
Households with cases of illness or injury in household in last 3 months lasting more than 24 hours and needing treatment but not hospitalisation		
OR (95 % CI)	0.54 (0.44-0.65) **	1
Households with cases of illness or injury in household in last 3 months requiring hospitalisation		
OR (95 % CI)	1.07 (0.89-1.29)	1
Households with complete vaccination coverage (BCG, DPT, Oral Polio, MMR) of all children in household between 6 months and 5 years		
OR (95 % CI)	1.04 (0.60-1.82)	1

OR = Odds Ratio; CI = Confidence Interval; * = p-value < 0.05; ** = p-value < 0.01;

4. Discussion

BI was seen to have a significant health protective effect with regard to minor illnesses and injuries, while no effect was measured with regard to more serious illnesses and injuries or child vaccination. A study by Forget (2011) which re-examined data from a pilot programme of a guaranteed annual income (similar to a basic income but means tested) in Canada in the 1970's showed a significant reduction in accidents and injuries requiring hospitalisation in the intervention group relative to the control group. Although accidents and injuries not requiring hospitalisation were not studied in the Canadian experiment, it is feasible that a reduction in serious accidents and injuries is an indication of a reduction in accidents and injuries in general. In Namibia in 2008, the basic income project there led the local health clinic nurse to conclude that there was a large reduction in cases of severe diarrhoea since the introduction of BI, likely due to improvements in nutrition (Haarmann et al. 2009). Although this statement is anecdotal in nature, it gives an indication that BI positively affected illness outcomes. Unfortunately, more scientifically rigorous evidence from this project seems unavailable. In Kenya between 2011 and 2012, a UCT project revealed no significant differences between control and intervention groups with regard to illness or injury in the household in one month (Haushofer and Shapiro 2013). Randomisation in this study however was at household level. In any one village half of the households received the intervention and half did not: transfers were not universal. This could possibly have disrupted any potential community level pathways (for example, involving social cohesion and social interaction) from cash transfer to illness/injury outcome. The same study did record increased psychological well-being, increased spending on food and medical expenses, as well as reductions in hunger among those who received the transfers but for whatever reason, this did not translate to lower levels of illness/injury, at least not in the time scale given. The CCT programme in Mexico, *oportunidades*, observed a 12

per cent lower incidence of illness in children in the programme compared to children not in the programme, while for adults there was a 19 per cent reduction in days of sick leave (Skoufias 2005). How much of the observed improvement is attributable to the condition and how much to the cash transfer itself is unclear, so a degree of caution is required in drawing parallels to the result in this study.

Since minor illnesses and injuries were positively impacted by the intervention, it is discrepant that more serious ones were not also affected, in particular, considering the results of the Canadian study above. However, differences in setting (poor rural India, 2011 and small urban town in Canada, mid 1970's) and study design mean that differences in observed outcomes are expected. It may be that the relationship between BI and illness/injury follows a biological gradient whereby the level of intervention (how much money is given) affects the scope or strength of outcome seen. The modest monthly sum given here, although able to impact minor illnesses and injuries, could not influence the course of more serious ones. A greater sum of money may have shown different results, as may a longer study period.

In both study arms complete child vaccination coverage was high, approximately 90 per cent. For the remaining 10 per cent, this does not mean that children in the household were not vaccinated, only that at least one child had not, at the time of asking, received all four vaccinations. There was therefore relatively little room for improvement. The high vaccination coverage may be attributable to the social protection programme, National Health Mission (NHM), which aims to provide universal access to quality health services, even for the poorest in the most desolate areas (Srivastava 2013). The non-significant result is consistent with findings from a study of a CT randomised control trial in Zimbabwe, featuring both a conditional and unconditional arm. Vaccination was high at baseline (> 94%) and did not improve

further due to the introduction of CTs. Vaccination services were provided through mobile outreach, and the transfers were not believed to influence access to these (Robertson et al. 2013).

Pathways between BI and health likely operate at individual and social level. On an individual level, Lundberg et al. (2007) describe two pathways: *neo-material* and *psychosocial*. *Neo-material* refers to the increase in material standard (for example, more nutritious food, housing improvements, higher health service consumption) stimulated by an increase in income (such as a BI). *Psychosocial* refers to the direct effect of income on social status which can negatively affect health. When individuals, in making comparisons of personal income and material standards with others in their social group, regard their situation as one of deprivation, stress reactions in becoming chronic can lead to ill health. Similarly, Wilkinson (2006) claims that relative income lays the ground for social position such that large income inequality becomes reflected in society as a wide span of social positioning, and harms (primarily) those with low status. BI, in redressing income inequalities to some degree, lifts the social status of those vulnerable, and removes the worse health risks associated with status. On a social level, BI may foster social cohesion (as social protection policies in general do (OECD 2009)), by levelling out income inequality, which is associated with poorer social relations and social division (Wilkinson 2006). Communities with higher levels of social cohesion are known to enjoy better health (Stansfield 2006). Another social level pathway involves the everyday, social interactions that take place between people in a community, and that can lead to what is called a social multiplier effect, that is, stronger than expected observed outcomes of an intervention because of peer-influenced behavioural changes (Scheinkman 2005). In other words, an intervention will not only have a direct effect on an individual's behaviour, but also an indirect effect since the behavioural change

will influence the behaviour of those with whom the person interacts. The benefits (or harm) accrued to one spread also to others in the community (Forget, Peden and Strobel 2013). BI provides income security, removing the stress associated with income insecurity. This may result in less harmful behaviours (for example, less aggressive or violent reactivity; causing less accidents because able to take time off to recuperate when ill; more likely to seek early treatment for an infectious disease) and thereby reduce the risk for others in the community. These pathways are not mutually exclusive nor contradictory, and all may be at work simultaneously. This is in agreement with a social determinants of health perspective that highlights multiple and multi-leveled causal pathways.

The BI pilot project was conducted as a cluster randomised trial. That randomisation was at village level and not individual or household level was a necessary prerequisite for it to be a study of basic income at all since BI is a transfer given universally: for each intervention village involved in the trial every village member (or as close to every member as possible) had to receive the monthly payments. Had a significant portion of the village population not received the transfers, any possible effects of the intervention working through community level mechanisms would potentially have been distorted. This said, cluster randomisation has potential shortcomings, in particular in trying to draw conclusions of causality between associated variables. Since the units of randomisation and analysis are different (here, villages and households), effective randomisation at the level of analysis is less likely because the clusters randomised are too few, and because individuals within the clusters may share similarities with each other more than with individuals from other clusters (Cochrane Collaboration 2002). This means that covariates in the study arms will not necessarily share similar distributions, making it less clear that differences in observed outcomes are due to the intervention itself. Here, it was seen

that cluster randomisation had sufficiently good randomisation effect at household level for 15 of the 23 variables chosen, but for eight of the variables the differences between intervention and control were significant. PSM was used to get around this problem and effectually recreate the conditions of a randomised control trial. While PSM is also limited in that characteristics not brought in to the model, both observed and unobserved, may lead to hidden bias (Oakes and Johnson 2006), the 46 per cent reduction of odds seen is a fairly strong association not likely explained by bias alone.

The pilot project aimed to observe a wide range of outcomes, not only health. In striving for breadth and comprehensiveness some specific areas may have suffered a lack of depth or more appropriate outcome measures. Regarding health, other information gathered could have given a fuller picture of the BI-health relationship, for example: quality of life (QoL), self-rated health, body mass index (BMI), incidence of diarrhoea, blood samples to measure, for example, haemoglobin (indicating anaemia) or cortisol (stress hormone), and cross-checking with clinical records.

BLS and FES were conducted at household level, but health may have been better assessed if each individual was questioned. For parameters of income however, household level data is likely the most suitable, particularly in low and middle income countries where finances are often pooled and decided upon within the household as a unit. BLS contained missing data raising questions of utility and validity, but the sensitivity analysis without BLS covariates did not affect the results. Other limitations concern the survey questions themselves whereby some are subjective by nature (for example, income sufficiency and income sharing) allowing for more bias. Considering income only in monetary terms may also be misleading if a proportionately large amount of household income is received in-kind.

5. Conclusions

Cash transfer programmes around the globe have proved their usefulness in alleviating poverty and achieving favourable health and social outcomes. Basic income, as a specific type of cash transfer, is also likely to contribute positively to the growing evidence base as and when it is introduced. With a solid foundation in social justice, BI is a social protection model highly congruent with the ideals of a social determinants of health perspective. This study has shown how basic income in a rural Indian context led to a reduction in the incidence of illnesses and injuries not requiring hospitalisation, although no significant effect was seen on more serious illnesses and injuries nor on vaccination coverage. Further studies providing a more complete picture of the health effects of BI are desirable. Nevertheless, the evidence thus far is promising and policy makers looking to implement cash transfers programmes, or more generally seeking models of social protection to improve people's lives, living conditions, and health, are advised to seriously consider BI as a viable and worthy alternative.

Conflicts of interests

None declared.

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Appendix 1

Sensitivity analyses

Table 4 Odds ratios of health outcomes in study arms (unimputed, matched dataset; baseline data excluded)

	Intervention	Control
Households with cases of illness or injury in household in last 3 months lasting more than 24 hours and needing treatment but not hospitalisation		
OR (95 % CI)	0.56 (0.46-0.68) **	1
Households with cases of illness or injury in household in last 3 months requiring hospitalisation		
OR (95 % CI)	0.97 (0.81-1.17)	1
Households with complete vaccination coverage (BCG, DPT, Oral Polio, MMR) of all children in household between 6 months and 5 years		
OR (95 % CI)	1.55 (0.94-2.57)	1

OR = Odds Ratio; CI = Confidence Interval; * = p-value < 0.05; ** = p-value < 0.01;

Table 5 Odds ratios of health outcomes in study arms (unimputed, matched dataset; cases with missing data excluded)

	Intervention	Control
Households with cases of illness or injury in household in last 3 months lasting more than 24 hours and needing treatment but not hospitalisation		
OR (95 % CI)	0.62 (0.48-0.80) **	1
Households with cases of illness or injury in household in last 3 months requiring hospitalisation		
OR (95 % CI)	1.05 (0.82-1.35)	1
Households with complete vaccination coverage (BCG, DPT, Oral Polio, MMR) of all children in household between 6 months and 5 years		
OR (95 % CI)	1.52 (0.78-2.97)	1

OR = Odds Ratio; CI = Confidence Interval; * = p-value < 0.05; ** = p-value < 0.01;