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Identifying pregnant and postpartum women's priorities for enhancing nutrition support through social needs programmes in a resource-constrained urban community in South Africa

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Abstract

Background Malnutrition remains a pressing public health concern for mothers and children in South Africa. Despite the government's multisectoral response, unaddressed social needs prevent some mothers getting full benefit from interventions, spanning financial planning, income stability, housing, access to government services, social support, and provision of affordable, nutritious foods. Engaging with mothers and prioritising their concerns is important if we wish to overcome obstacles to women benefiting from government nutrition interventions. This study aimed to identify the programmes that women perceived as a priority in addressing the social needs of mothers of young infants and pregnant women to enhance nutrition in a resource-constrained urban township in South Africa.

Methods A cross-sectional study employed a quantitative preference elicitation survey, administered to 210 mothers and pregnant women from five primary healthcare facilities in Soweto. The survey tool was developed with the community to identify unmet social needs and potential solutions, which were synthesised with findings from the literature. The survey described 15 programmes, grouped into three delivery levels: clinics, community, and government. Participants were required to rank programme options in two stages. First, they selected their top two programmes within each delivery level. Subsequently, they allocated stickers to indicate the strength of their preference among the top programmes across the levels. Rankings were analysed using descriptive statistics.

Results The highest priority was given to five programmes. Two delivered at the community level: *Women's economic empowerment groups* and *Job search assistance*, two at the clinic level: *Social needs assessment and referral*, and *Prescription-based food*, and one at the government level: *Free quality childcare*. The lowest-ranked programmes were two clinic-based programmes, specifically *Maternal nutrition groups* and *Couple antenatal education*.

Conclusion Women expressed strong views about which programmes should be prioritised to support mothers and pregnant women in addressing their social needs and improving nutrition. Key areas included providing support with job searching and entrepreneurship, accessing childcare and the healthy foods recommended at clinics, as well as finding information on available community and government services. Leveraging multisectoral collaboration,

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aligned policy objectives, efficient public financing, and strengthened implementation capacity will be pivotal in delivering these programmes.

Keywords Social needs, Preference elicitation, Nutrition, South Africa, Maternal and child health

Introduction

Sub-Saharan Africa grapples with the complex challenge of a triple burden of malnutrition [1], encompassing overnutrition, undernutrition and micronutrient deficiencies. Most countries in this region are falling short of achieving the global nutrition targets for 2025 set by the World Health Assembly [2].

In 2022, the people of sub-Saharan Africa represented a significant portion of the global malnutrition burden, with around 57 million out of 148 million stunted children, and 7 million out of 37 million overweight children residing in this subregion [3]. Moreover, malnutrition among women in this subregion is also characterised by high rates of obesity (41.5%), diabetes (13.9%), and anaemia (30.3%) [4].

The sub-Saharan African research community recognised the heavy burden of malnutrition in the region, well before global nutrition targets were set. Growing concern led to consultations in 2011 with stakeholders from civil society, private, academic, and nongovernmental organisation sectors, multilateral and bilateral organisations including those from South Africa. Participants agreed on the pressing need for action, particularly in anticipation of ecological and socio-demographic challenges that would impact nutrition in the region over the next decade [5]. Among the various research options appraised for their potential to address malnutrition in Africa, a priority was to increase the evidence base for community-level nutrition programmes/interventions. Stakeholders emphasised the need to actively engage communities in research activities to ensure that the research and its recommendations contextually appropriate and socially acceptable. In guiding practical actions within this priority area, reference was made to United Nations General Assembly recommendations, which advised countries to integrate community-based research into their national action plans for disease prevention [5].

In South Africa, where high rates of maternal and child malnutrition persist—23% of children under five are stunted and 13% are affected by overweight and obesity [6], and 31% of women of reproductive age are anaemic [6], while 69% are living with overweight or obesity [7]—there is a commendable effort to integrate community perspectives and local realities into national policy and strategy documents. This is evident in documents like the Guidelines for Maternity Care in South Africa [8], where emphasis is placed on the "empowerment of women, families and communities to contribute to improving maternal, perinatal and family health, and addressing conditions that adversely affect the outcome of pregnancy (e.g., lack of transportation)" through community involvement. Additionally, the guidelines also emphasise the consideration of "local realities in terms of underlying causes of ill maternal health (e.g., poverty, illiteracy)" when identifying shortcomings in health service and their utilisation by pregnant women [8].

Despite these policy provisions, the translation of community engagement approaches into practical steps have fell short to date in South Africa. Only a few small-scale studies have examined the lived experiences of pregnant women and mothers of young infants in aiming to understand their perspectives and generate recommendations for how utilisation of health services might be optimised.

What is clear is that availability of nutrition services through the health and social protection sectors does not guarantee optimal early life nutrition for mothers and children. The impact of these services is influenced by the extent to which recipients can benefit from them. Recent investigations in Soweto, a resource-constrained urban area near Johannesburg, have shown that many mothers face significant obstacles that hinder their ability to derive benefits from key available services, that could otherwise help them ensure optimal nutrition [9, 10].

In this article we describe a systematic approach anchored in community engagement and the evidence to identifying programmes that women perceive as a priority for addressing the social needs of mothers with young infants and pregnant women, ultimately aiming to enhance nutrition in a resource-constrained urban township in South Africa. Identifying priority programmes could help recipients of existing healthcare and social protection services maximise nutrition benefit from these programmes and so enhance the impact of services. This article represents the third and fourth step of a larger study which has adopted an iterative process to define, identify, and address social needs as a means of enhancing mothers' capabilities of getting the full nutrition benefit of available services. The study is underpinned by a novel social needs framework [10], anchored in Sen's capabilities approach [11] and Bronfenbrenner's ecological model [12]. The framework highlights that the

availability of a service is not an end in itself. The effect of a service is moderated by differences in the degree to which recipients can benefit from it. Where an individual sits on the benefit scale is determined by the degree to which individual social needs are met.

The following describes the study design, the empirical work underpinning the development of a quantitative data collection tool, and the tool itself. We then report on the main findings from a survey using this tool, discuss those findings and we conclude with considering policy implications.

Methods

Study design

To elicit the affected population's preferences for social needs programmes for mother and child nutrition, we conducted a cross-sectional study using a quantitative survey in Soweto, a low-middle income urban settlement near Johannesburg. Soweto is home to 1.7 million people, including 125,000 children under five. The inhabitants are predominantly Black South Africans, encompassing various cultural and ethnic identities such as Zulu, Xhosa, Sotho, Tswana, Tsonga, English, and Afrikaans [13]. Economically, Soweto is diverse, featuring middle-class neighbourhoods, working-class communities, and informal settlements. Marginalisation during apartheid and its aftermath have resulted in poorer neighbourhoods with inadequate housing, shared public toilets, unpaved roads, limited access to healthy and affordable foods, and deficient educational and recreational opportunities [14–16].

Social needs identification

To identify social needs we conducted seven focus group discussions (FGDs) with 30 mothers of infants (< 1 year old) and an additional 21 pregnant women attending primary healthcare facilities in Soweto. We supplemented these with 18 interviews with employees from 10 community-based organisations (CBOs) working in Soweto. FGD participants were purposively sampled to ensure maximum diversity in the healthcare facilities they used. For CBOs sampling, consideration was given to ensure representation from various suburbs in the study area. Data collection took place from February to October 2022, with all participants having provided informed written consent. Detailed study procedures and participants' characteristics are reported elsewhere [9, 10]. Here, we focus on the data analysis and findings. Analysis and interpretation were guided by the aforementioned social needs framework developed for the larger study [10]. The framework was operationalised for social needs related to maternal and child nutrition in Soweto, a process which identified six social needs related to financial planning, personal income stability, appropriate and affordable housing, to government services, social support, and affordable healthier foods. The degree to which these needs were met determined mothers' capability to benefit from eight services including nutrition advice and social work support, social grants, food aid, community savings groups, poverty alleviation projects, skills training workshops, formal employment opportunities and crèches/school feeding schemes [10]. In addition to identifying social needs, participants were also asked to provide recommendations for programmes that could help address these needs. These recommendations are analysed and incorporated into the groundwork for the social needs programme identification process.

Social needs programme identification process

To identify and formulate a set of potential programmes for meeting the six social needs of interest, we triangulated information from three sources. First, we relied on FGDs with pregnant and lactating women and CBO interviews data from our previous analysis [9, 10] to extract programme recommendations. Participants' proposed measures largely focused on strengthening and customising the aforementioned eight services and resources deemed important for improving nutrition, but unmet needs limited mothers' capacity to benefit from these.

Second, the programme identification process was further informed by our assessment of how community-level services provided by the aforementioned CBOs aligned with the social needs of mothers and pregnant women. This assessment revealed four pathways through which CBOs perceived to help meet mothers' needs, while also highlighting some gaps where social needs were not being met by existing services and so warrant optimisation or additional strategies [9].

The third step in the programme identification process involved a targeted search and review of peer-reviewed research, published in academic journals. The targeted review identified evidence of feasibility and effectiveness of the programme recommendations generated by mothers and CBOs. Paper inclusion criteria and programme inclusion criteria are given in Table 1.

Data synthesis was undertaken using a matrix developed in Microsoft Excel (see Additional file 1 for an example). Information was extracted from the FGD and individual interview transcripts on recommendations for specific programmes, related social needs and the pathways through which they addressed these. This was followed by extracting information from peer-reviewed articles that were purposively selected based on our inclusion criteria. The information obtained from these articles included details about the authors, geographical

Table 1 Inclusion and exclusion criteria peer-reviewed article selection and for social needs programmes

Article inclusion criteria	Article exclusion criteria
- Targeted review of the literature - Study design: quantitative (cross-sectional, cohort, prospective, case–control studies) and qualitative studies - Populations: Pregnant women, mothers, low-income women, children aged 0–6, teenage girls, low-income households - Focus: relevance to programmes suggested by study participants - Outcomes: Improvements in dietary behaviour, maternal and child nutrition-related outcomes (e.g., stunting, anaemia), health and mental wellbeing, social needs (housing, financial planning, personal income, access to government services, social support, affordable healthier food among others) - Geographical focus of study in order of priority: 1) South Africa, 2) Africa, 3) non-African LMICs, 4) low-income setting in high income country - Time frame: since 2000 up to March 2023	- No reporting on outcomes - No impact reported, or the reported impact on health, nutrition and/or social needs is non-beneficial - Evidence from the study area (Soweto) shows no uptake, or no intent for uptake the programme of under evaluation - Programme of interest is an agricultural intervention (e.g., poultry, agroecology-practices, farming techniques) or population level interventions that does not involve the individual directly (e.g., tax exemption on certain foods to make them cheaper; regulatory actions) - Populations of interest are elderly people, or patient samples (children with specific conditions/diseases)
Programme inclusion criteria	**Programme exclusion criteria**
- Explicit recommendation by FGD participants and CBOs - Implicit solution, based on identified social needs - Addressed a gap[a] left by CBOs - Evidence-based (peer-reviewed literature or policy report where the former is not available): evidence exists on service's positive effect on health, nutrition and/or social needs	- Explicit reference from FGD participants and CBOs that a service is not preferable or feasible - No similar service found in the literature - Evidence from peer-reviewed literature from the study area shows no uptake, or no intent for uptake of services by service beneficiaries

[a] Gaps identified in Author et al. (2024) included: (childcare support, skills in resource management, parenting skills and maternal identity, income generating groups) [9]

location, a summary of the programme of interest, and any available insights regarding their impact on nutrition and/or social needs.

The research team synthesised information from the various data sources and systematically condensed over 30 recommendations to 15 by eliminating duplicate responses and combining similar ideas.

Identified social needs programmes

Additional file 2 provides a detailed overview of the programmes, the social needs, supportive evidence from the literature, and quotes from participants in the primary study [10]. In Table 2 we present the plain language description of the 15 programmes produced by the analytic process described above that formed the basis of the survey. The programmes were of three levels of delivery: clinics, community, the government. The 15 unique programmes reflected realistic options for addressing mothers' and pregnant women's social needs in Soweto.

Preference elicitation survey tool

When developing the quantitative survey tool, we followed Font et al.'s (2016) [17] approach, which Núñez and Chi (2021) [18] have recently modified for the Chilean context. These studies stand out from traditional quantitative survey-based methods used for public preference elicitation for three reasons. First, because of their philosophical foundation in communitarianism, they focus on society rather than individuals. Second, they incorporate trade off consideration in decision making through using a non-monetary budget experiment. This allowed the researchers in Guatemala [17] and Chile [18] to present survey participants with realistic decision-making contexts which take into consideration opportunity costs. Last, this approach enabled relatively sophisticated decision making in communities that were unused to being consulted. This combination of features provided a strong foundation for the development of the preference elicitation tool, which is described in this manuscript and provided in additional file 3.

The tool consisted of three parts. First, a short demographic questionnaire collected details on respondents' education level, marital status, employment, household type, income and size, and level of food insecurity at the time of the survey administration. The second part involved ranking 15 social needs programmes, which were grouped into three blocks of five programme choices each by delivery levels: clinics, community, and government. Care was taken to ensure that no programme appeared significantly more costly to deliver than the others within each block. This meant that although programmes might differ in their resource requirements in theory, none stood out as being notably more costly when grouped this way. Programmes were described using clear and simple language, accompanied by a picture to enhance comprehension. With the help of the research assistant, they were tested with individuals from the community who had no prior knowledge of the study or its methodology to check their clarity. Participants were then asked to rank programme options using

Table 2 Description of the 15 social needs programmes forming the basis of the preference elicitation survey

Community-based social needs programmes

A. **Community gardens:** A community vegetable garden, with tools, seeds, and training to cultivate. Moms can save money on vegetables and earn income by selling produce

B. **Women's economic empowerment groups:** Monthly learning groups to teach moms how to start small businesses, budget, and do marketing. Moms can save up together and access loans to start their business

C. **Soup kitchen:** Free daily nutritious meals to children, pregnant and breastfeeding moms in the community. Moms can volunteer to help

D. **Job search assistance:** Moms learn job search skills, including CV writing and interview preparation. They receive a certificate after a skills assessment to strengthen job applications

E. **Pay-as-you-go fridge:** Own an electricity-free fridge for as little as R20/day, allowing moms to buy in bulk and reduce worry about food waste

Government-based social needs programmes

F. **CASH + Baby necessities**: Moms with Child Support Grant (CSG) will receive monthly supplies of diapers and toiletries for 18 months from point of delivery, so saving the CSG money for other essentials

G. **CASH + Vocational and skills training grant**: Moms with CSGs can enrol in a vocational skill training 6 months after birth, enhancing their employability, and computer and financial literacy

H. **Free quality childcare**: Low-cost or free day-care will be provided for children, while moms are at work or looking for employment

I. **Maternity protection entitlements:** The CSG will be extended to the period of pregnancy, reducing worry about money. Moms in formal and informal employment will receive maternity pay for up to 6 months[a]

J. **Mobile government service truck:** Mobile government offices (vehicles) will drive to the community, providing easy access to ID and CSG services. Moms don't have to travel

Clinic-based social needs programmes

K. **Maternal nutrition groups:** Clinic-based antenatal and postnatal peer support groups focusing on budget-friendly nutrition, motherhood, bonding, self-esteem

L. **Prescription based food:** Monthly healthy food vouchers with budgeting and shopping tips, provided to mothers from the 1st ANC visit until the child's 2nd birthday

M. **Social needs assessment and referral:** Non-medical needs (i.e., housing, finances, food, employment, mental health) assessment of mothers, and referral to related community and government resources, as part of routine antenatal and postnatal services

N. **On site maternal meal provisioning:** Free nutritious meal provisioning to pregnant and lactating mothers as part of routine antenatal and postnatal services

O. **Couple antenatal education:** Antenatal education for mothers and partners promoting men's active involvement in supporting mothers during pregnancy, childbirth, and in baby care

[a] *Extending existing provision from 4 months and only for those in formal employment*

a five-step ladder. Utilising this type of visual aid has been found to be effective in administering priority ranking exercises in communities not accustomed to making such decisions [17]. To ensure that individuals' choices were driven by community well-being, participants were asked to consider their preferences for mothers in the community who struggle to benefit from services rather than considering their own needs.

In the third part of the survey, participants were invited to revisit six of their priority choices from the previous section. These six programmes were those to which they had assigned priority one and two in each of the three program blocks that they had been presented with in the second part of the survey. We introduced a non-monetary budget experiment where we aimed to present mothers with a realistic decision-making context that considered opportunity costs. The presentation stressed that allocating funds to one programme meant diverting them from another. This meant that participants were making real-world choices instead of choosing based on face value or without considering their resource limitations. To facilitate assessment of trade-offs, participants received 18 stickers, representing their non-monetary budget, to allocate to the six programme choices. Participants were informed that they had to allocate a minimum of three stickers to select a programme. The rationale behind the minimum allocation of three stickers (result of dividing 18 stickers by six programmes) is that it allowed the introduction of the critical trade-off element into the decision-making process. Allocating more than three stickers to one programme meant that at least one programme would not receive any stickers, thus simulating the reality of limited resources. The decision to use stickers instead of hypothetical money was for several reasons. First, research has shown that hypothetical money tends to lead participants to allocate the majority of resources to a single programme or a limited number of programmes, rather than prioritising among all options [18]. Second, hypothetical money might skew individuals' preferences toward market incentives (that

they believe would be economically advantageous or a rational decision) rather than actual priorities [18].

Sampling and recruitment

Survey participants were purposively selected from the population of mothers and pregnant women who were receiving antenatal and post-natal care at five primary health care facilities in Soweto. Recruitment was carried out by a trained research assistant with extensive experience in the community, who approached women (>18) at the waiting room of the clinics. Women were eligible if they were either pregnant or had a young infant under one year of age, and they had to be residents of Soweto. Following a sampling approach used in previous studies that involved ordinal ranking exercise [30, 32], we aimed to administer the survey to a sample of 200 mothers and pregnant women. A sample size of 200 was deemed adequate for undertaking the ordinal ranking analysis [19].

Data collection procedures

Prior to pilot testing and implementation, the survey was refined with the help of a research assistant who was well positioned to advise about the wording with which mothers and pregnant women would be most familiar. Furthermore, to test the concordance between the respondents' interpretation of the survey questions and the questions' intended meaning, we administered comprehension test questions.

The preference elicitation survey was administered between July and September 2023. Informed consent was obtained from participants after providing them with detailed information about the study's purpose and procedures, ensuring that their participation was voluntary. The data collection tool was piloted with 20 mothers to ensure its reliability, validity, and comprehensibility. Questionnaires were administered in hard copy format, and strict data quality controls, including cross-checking data entry by the first author, were implemented minimise errors. Measures to maintain confidentiality included assigning a unique participant number to each mother and removing any identifiers from questionnaires.

The survey took approximately 15 min to complete, and it was administered by the research assistant. Questionnaires and consent forms were written in English however, the research assistant helped participants with translating and interpreting the questions in a language that they were most comfortable with.

Survey data analysis

Paper based data were captured electronically in REDCap by the first author. The data were cleaned in Microsoft Excel and analysed using STATA version 18. Sociodemographic data were analysed using descriptive statistics. To determine programme priorities, respondents' programme ranking was analysed in three ways. First, we conducted frequency analysis to determine the number of times a programme was selected as first or second priority (referred to as top priority). Second, we aggregated the total amount of stickers allocated to each programme. Third, we calculated the mean sticker value of each programme.

We defined a programme high priority if it was frequently selected as top priority, and it ranked high based on mean sticker value and total sticker amount compared to other programmes. We defined a programme low priority if it scored low on all three accounts.

Results

Characteristics of study participants

A total of 210 participants completed the survey to prioritise social needs programmes that would help mothers in the community who struggle to benefit from existing services to improve their and their children's nutrition. Table 3 presents key demographic characteristics of the survey respondents. Participants' ages ranged from 18 to 49 years, with a mean age of 31 years. Seventy-five percent of participants cared for at least one child, of whom 45% had between 2 and 4 children. Twenty percent were pregnant for the first time. A majority, 61% reported receiving the child support grant. Approximately half of the sample had completed high school and lived with their husbands or partner. Monthly household income levels varied with 60% of participants reporting incomes between ZAR 1001 and 5000 (USD 55–272), though 20% had incomes of ZAR 1000 (USD 54) or less. Government grants were the primary source of income for 62% of participants, while 33% were engaged in formal, and 18% in informal, employment. A significant portion, 79%, relied on others within their households for income. In terms of food security, 54% of participants reported being able to obtain all the foods recommended by the clinic to keep themselves and their babies well-nourished for only a few days a month, while 21% could do so only during the first half of the month. A smaller percentage, 21%, reported being able to get all advised food throughout the entire month.

Preference elicitation

The results of the preference elicitation process are presented in Table 4, in the three ways described above. In the left section of Table 4, we provide the programme ranking based on the frequency and percentage of respondents who selected each programme as their first or second priority (top priority). In the middle section, we present the programme rankings according to the

Table 3 Demographic data for survey participants $n = 210$

Age (years)		
Minimum–maximum; Mean [SD]	18–49	31 [8]
Pregnancy status	**N**	**%**
Pregnant	106	50.5
Non-pregnant	104	49.5
Number of babies/children cared for		
0 – first time pregnant	42	20
1	87	41.4
2–4	72	34.3
5 and above	9	4.3
Child Support Grant		
Receive	129	61.4
Do not receive	81	38.6
Marital status		
Married or partnered living with spouse	107	50.9
Married or partnered not living with spouse	75	35.7
Single/not in a relationship	28	13.3
Highest level of schooling		
No formal schooling	1	0.48
Primary school	8	3.81
Some high school	57	27.14
Completed high school	97	46.19
Diploma/higher diploma	43	20.48
Bachelor's degree	3	1.43
Graduate (Masters/PhD/Professional degree)	1	0.48
Household income		
ZAR 1000 or less (USD 54)	42	20.19
ZAR 1001- 3000 (USD 55–163)	77	37.02
ZAR 3001-5000 (USD 163–272)	51	24.52
ZAR 5001-10000 (USD 272–545)	23	11.06
ZAR 10001–20000 (USD 545–1089)	3	1.44
Source of income (at the time of the survey)		
Government grants	130	61.9
Formal employment	69	32.9
Informal employment	37	17.6
Rely on others in the household	165	78.6
Type of house		
House/flat that is owned/rented	93	44.3
Government-built house	24	11.4
Shack or informal dwelling	32	15.2
Single outside room rented	52	24.8
Single room inside a house that is rented	7	3.3
Household size	**Mean (SD)**	**Min–max**
Number of adults, mean (SD); min–max	2.6 (1.2)	0–9
Number of children	2.0 (1.3)	0–6
Food security[a]		
Through the entire month	44	20.95
Only in the first half of the month	45	21.43
For a few days only	113	53.81
Not at all	8	3.81

[a] Ability to obtain recommended foods by the clinic to ensure that the mother and her baby are well-nourished

Table 4 Participants' ranking of social needs programmes according to high and low priority

RANKING BY BEING TOP PRIROITY				RANKING BY MEAN STICKER VALUE				RANKING BY TOTAL STICKER AMOUNT			
Programmes	No. of votes	Total no. of stickers	Mean sticker (SD)	Programmes	No. of votes	Total no. of stickers	Mean sticker (SD)	Programmes	No. of votes	Total no. of stickers	Mean sticker (SD)
M. Social needs assessment	122	418	3.43 (1.35)	D. Job search assistance	94	377	4.01 (0.91)	B. Women's economic empowerment group	116	450	3.88 (0.93)
B. Women's economic empowerment group	116	450	3.88 (0.93)	B. Women's economic empowerment group	116	450	3.88 (0.93)	M. Social needs assessment	122	418	3.43 (1.35)
L. Prescription based food	108	305	2.82 (1.71)	E. Pay-as-you-go fridge	19	66	3.47 (1.50)	D. Job search assistance	94	377	4.01 (0.91)
H. Free quality childcare	107	322	3.01 (1.53)	M. Social needs assessment	122	418	3.43 (1.35)	H. Free quality childcare	107	322	3.01 (1.53)
C. Soup Kitchen	97	211	2.17 (1.73)	J. Mobile government	46	154	3.35 (1.38)	L. Prescription based food	108	305	2.82 (1.71)
F. Cash + baby necessities	95	250	2.63 (1.69)	G. Cash+ vocational training	85	268	3.15 (1.41)	G. Cash+ vocational training	85	268	3.15 (1.41)
D. Job search assistance	94	377	4.01 (0.91)	H. Free quality childcare	107	322	3.01 (1.53)	A. Community Garden	91	254	2.64 (1.59)
A. Community Garden	91	254	2.64 (1.59)	I. Maternity protection	82	241	2.94 (1.62)	F. Cash + baby necessities	95	250	2.63 (1.69)
N. On site maternal meals	91	238	2.61 (1.73)	L. Prescription based food	108	305	2.82 (1.71)	I. Maternity protection	82	241	2.94 (1.62)
G. Cash+ vocational training	85	268	3.15 (1.41)	A. Community Garden	91	254	2.64 (1.59)	N. On site maternal meals	91	238	2.61 (1.73)
I. Maternity protection	82	241	2.94 (1.62)	F. Cash + baby necessities	95	250	2.63 (1.69)	C. Soup Kitchen	97	211	2.17 (1.73)
K. Maternal nutrition groups	64	137	2.14 (1.89)	N. On site maternal meals	91	238	2.61 (1.73)	J. Mobile government	46	154	3.35 (1.38)
J. Mobile government	46	154	3.35 (1.38)	C. Soup Kitchen	97	211	2.17 (1.73)	K. Maternal nutrition groups	64	137	2.14 (1.89)
O. Couples' antenatal education	31	67	2.16 (1.81)	O. Couples' antenatal education	31	67	2.16 (1.81)	O. Couples' antenatal education	31	67	2.16 (1.81)
E. Pay-as-you-go fridge	19	66	3.47 (1.50)	K. Maternal nutrition groups	64	137	2.14 (1.89)	E. Pay-as-you-go fridge	19	66	3.47 (1.50)

(Dark grey indicates high priority, and light grey represents low priority)

mean sticker value associated with each programme. Last, on the right side of Table 4, the programmes are ranked based on the total number stickers allocated to each programme. In all rankings, higher priority programmes are positioned at the top.

In the following section, we present the results of participants' programme preferences for addressing the social needs of mothers with young infants and pregnant women. We organise these into two groups. The first group comprises high priority programmes that scored consistently high in each of the three categories in Table 4. The second group comprises the low priority programmes that consistently scored low across all rankings.

High priority programmes

The programmes that attained the highest ranking across all three criteria, including being identified as top priority most often, the total number of stickers assigned to them and the mean sticker value, included at least one programme from those delivered at clinic, community, and government level (see Table 5 for plain language description of high priority programmes). Within these five high priority programmes, two – *Social needs assessment and referral (M),* and *Prescription based food (L)* – were both services by clinics. Across all 15 programmes, *Social needs assessment and referral (M)* was ranked the highest in terms of the number of time participants identified it as their top priority ($n=122$). This programme also earned the second highest total number of stickers with 418. Within the same block, similarly high priority was assigned to *Prescription based food (L)* with 108 participants selecting it as their top priority and allocating 2.82 (SD 1.71) stickers to this programme on average, contributing to a total of 305 stickers. Among the four social needs programmes aimed at addressing unmet social needs for healthier food access, *Prescription based food (L)* received higher priority than *Onsite maternal meal provisioning (N)* at the clinic level, and *Soup kitchens (C)* and *Community gardens (A)* at the community level.

Two programmes, *Women's economic empowerment groups (B)* and *Job search assistance (D),* were services delivered at community level and were selected as a top priority by 116 and 94 respondents respectively. In terms of average number of stickers allocated by each respondent, *Job search assistance (D)* gathered more than all other

Table 5 Descriptions of the five social needs programmes assigned the highest priority by mothers and pregnant women in the Soweto community grouped by their level of delivery

Clinic	Community	Government
M. Social needs assessment and referral: Mothers will be asked questions during antenatal and postnatal visit about their non-medical needs and challenges (i.e., housing, finances, food, employment, mental health) that they may need help with. They will receive information and referral to community and government resources **L. Prescription based food**: Moms receive "healthy food prescription" voucher during their 1st ANC visit, lasting until the child's 2nd birthday, with budgeting and shopping tips provided, allowing moms to buy advised food at the clinic	**B. Women's economic empowerment groups**: Monthly learning groups to teach moms how to start a small business, budget, and do marketing. Moms can save up together and access loans to start their business **D. Job search assistance:** Moms will gain job search skills, including CV writing and interview preparation. They will receive a certificate after a skills assessment to strengthen job applications	**H. Free quality childcare**: Low-cost or free daycare will be provided for children, while moms are at work or looking for employment

programmes, with an average of 4.01 stickers (SD 0.91). *Women's economic empowerment groups (B)* secured the second-highest average with 3.88 stickers (SD 0.93). A *Cash + vocational and skill training programme (G)*, which aimed to enhance mothers' employability, and computer and financial literacy, were less frequently selected as a top priority by mothers. It also received lower mean and total stickers despite its fundamental similarity to programmes *(B)* and *(D)*.

Free quality childcare (H) as a programme delivered at government level secured the fourth highest ranking on two fronts. First, with 107 respondents choosing it as their top priority, and second with a mean sticker value of 3.1 (SD 1.53). *Free quality childcare (H)* was prioritized over *Maternity protection (I)* despite both programmes' role in supporting working mothers and ensuring the well-being of young children. The difference was in the approach; programme *H* helps mothers by offering a safe and nurturing environment for their children, allowing them to engage in work or other activities, as opposed to programme *I* that focused on policies and measures that protect the rights and well-being of pregnant women, such as maternity leave.

Low priority programmes

Among the programmes that received consistently low rankings across all three criteria, two clinic-based programmes stood out, namely *Maternal nutrition groups (K)*, and *Couple antenatal education (O)*. The former was identified as a top priority by only 64 out of 210 mothers, received the third lowest total number of stickers and the lowest average sticker value with a mean of 2.14 (SD 1.89). Similarly, *Couple antenatal education (O)* ranked second-to-last in all evaluations, as only 31 participants selected it as a top priority. These participants collectively allocated 67 stars, with a mean of 2.16 (SD 1.81).

Discussion

Mounting evidence, encompassing both quantitative and qualitative sources, indicates that programmes are currently failing to deliver anticipated improvements in maternal and child nutrition outcomes necessary meet global [20] and national targets in South Africa. Recent qualitative research conducted in Soweto, a resource-constrained urban township, has revealed a critical gap between the offer of primary healthcare and social protection services and pregnant and postpartum women's ability to fully leverage these for optimal maternal and child nutrition. While these are recognised as pivotal services for improved nutrition, unmet social needs of mothers limit the desired impact of existing services [10]. This paper presents a systematic process, grounded in community engagement and informed by evidence, for the development of 15 distinct programmes tailored to the social needs of pregnant and postpartum women in Soweto. It further identifies those social needs programmes that women prioritise, which could be implemented with the ultimate goal of enhancing nutrition in a resource-constrained urban township in South Africa.

We showed that mothers and pregnant women prioritised programmes that addressed their needs for support with job searching, entrepreneurship, accessing the healthy foods recommended at antenatal and postnatal clinics, childcare, and access to information regarding community and government services available to them. Below we discuss the programmes prioritised by women in greater detail, discuss what is already known about their effectiveness based on existing evidence. (See Additional file 2 for more information on the literature). We also situate these programmes within the context of the National Development Plan 2030 (the Development Plan), that provides a comprehensive framework for action across multiple sectors in South Africa [17]. The

section concludes with reflection on policy implications of our findings.

Women's economic empowerment

In the Soweto context, increasing mothers' asset base through economic empowerment is of great importance, given that many of the women in the area are financially dependent on their partners, families, and social grants. Our survey results suggest that linking mothers with income-generating, livelihood, and savings opportunities, particularly those that do not require them to travel far, is a high priority. Community-based microenterprises like sewing, baking and local healthy food production are among the recommended options to explore, according to mothers in this and our previous study [9]. There are intervention models, tested and validated, available to guide the establishment of such groups which enhance economic prospects and promote financial independence, including from South Africa [22], Bangladesh [23] and India [24]. These models, proven effective in improving nutrition and addressing social needs (see Additional file 2), share a common focus on fostering economic self-reliance and skill enhancement among women. They include components such as literacy, numeracy, business acumen, marketing skills, and income-generation activities. A core element of these initiatives is the provision of essential starter kits to support income-generating endeavours and established savings and credit groups.

South Africa's National Development Planning Commission (The Commission) emphasises the vital role of public employment opportunities, such as public works programmes, in bridging the gap between social grants and sustainable employment. The Commission claims that these initiatives extend beyond mere income transfers, playing a crucial role in empowerment [21]. These programmes include education in topics such as early childhood development and community based care, often with training and skills development supported by the Department of Higher Education and Training [25]. Other programmes support economic growth by assisting women-owned small, medium and micro enterprises [26].

Mothers in Soweto, who are unaware of or unable to access existing programmes, could benefit from being connected to initiatives such as public works, and government institutions that provide services such as one-off productive cash transfers, financial literacy training, and skills training. This could ensure the necessary technical support to establish and manage small businesses, as well as financial support in the form of start-up costs and loans.

Job search assistance

The high priority the community placed on assisting mothers with job searches, including help in finding employment opportunities and crafting job applications and CVs, is driven by the recognition that these life skills are unmet social needs within the community. Addressing this need in Soweto, where 64% of young mothers were unemployed in 2018 [15], was identified by participants in our previous study as a crucial means to enhance the nutritional well-being of both mothers and their children [10].

The unmet needs for employment services in Soweto mirrors broader national deficits outlined in the Development Plan. The Department of Labour's regional office offers limited public employment and placement services, catering to a small scale of individuals [21]. By 2030, The Commission envisions the expansion of these services to address the needs of the unemployed, particularly focusing on facilitating job placement and offering skills development opportunities, with a special focus on youth and women. Evidence from South Africa [27, 28] offers valuable insights into intervention models with positive employment effects. Furthermore, gatherings of mothers on payment days for those enrolled in cash transfer or at public works sites could be explored as an opportunity for providing additional training and support.

Free quality childcare

Those we surveyed in the Soweto community felt it was imperative to prioritise access to high-quality, free childcare services for women. Many mothers face a significant obstacle in accessing and benefitting from existing childcare facilities because they cannot afford them, which in turn limits their ability to work. These financial challenges are intricately linked to macro-level issues, such as the difficulty in formal registration as a crèche for several CBOs, which prevents them from receiving government subsidies [9]. As a result, these organisations are forced to charge fees. These issues were identified over a decade ago by The Commission in 2012, which urged action to achieve universal access to quality early childhood development by 2030, with a focus on nutrition and education [21]. With just six years left until the target year, mothers in the present study continue to face the same financial obstacles that prompted the 2030 Development Plan. The Commission's recommendations remain relevant, emphasising the need for increased state funding and support to ensure universal access, improved coordination between departments, and collaboration with private and non-profit sectors.

To address this issue effectively, insights can be drawn from successful models like that implemented in Nicaragua [29], where the government increased the availability and quality of childcare centres, with particular focus on ensuring access for urban families living in extreme poverty. The positive impact of this initiative included improved socio-emotional skills among children, and enhanced participation of mothers in the workforce outside their homes.

Prescription based food

In case of malnutrition during pregnancy, South Africa's Basic Antenatal Care plus Handbook (the Handbook) recommends that women increase their intake of a diverse range of healthy foods, including "meat, fish, oils, nuts, seeds, cereals, beans, vegetables, cheese, milk, to help her feel well and strong" (page 46) [30]. Recognising malnutrition as often linked to poverty, the Handbook emphasises the importance of assessing mothers' social circumstances and when deemed necessary, referring them to social workers and providing food parcels. However, communities, including our previous study participants [10] and those taking part in other Soweto-based studies [31] consistently report that food parcels do not adequately cater for the nutritional requirements advised at clinics. It is in this context that healthy food voucher provisioning in the first 1000 days was voted a high priority for mothers. Ensuring mothers' access to the food advised at the clinic would enhance nutrition impact of ante- and post-natal care services and shift the current narrative from treating malnutrition (as in the Handbook) to prevention.

The Development Plan proposes several policies to enhance food and nutrition security, including food grants and pricing strategies, specifically targeting mothers, infants, and children. Furthermore, the Commission identified the introduction of a new nutrition program for pregnant women and young children by 2030 as a "quick win" in alleviating the immediate impact of poverty on millions of South Africans (page 28) [21]. Our findings, coupled with evidence-based intervention models of food voucher provisioning to mothers and children in the critical period of the first 1000 days of life provide with guidance for action [32–34].

Social needs assessment

The Development Plan commits to establishing a responsive social protection system by 2030, tailored to the needs, realities, and livelihood conditions of its beneficiaries [21]. One strategy to realise this vision is the screening mothers for their social needs and providing them with information and referrals to community and government resources. Such a referral model was a high priority for those who took part in our study. They suggested the integration of such screening into routine antenatal and postnatal clinic visits and strengthening partnerships between CBOs and clinics [10]. Fostering effective collaboration between clinics and CBOs would reduce current information gaps and improve access to community resources for mothers.

In high-income countries, integrating the identification of social needs and linking patients with basic resources is increasingly part of routine clinical care, including in perinatal [35] paediatric settings [36, 37]. Evidence indicates that investing in screening for and addressing unmet social needs can lead to increased enrolment in community programmes, enhance employment prospects, increase access to childcare and fuel assistance, and reduce likelihood of homelessness [37]. Screening and referral services also positively influence women's dietary habits, physical activity, and mental well-being, breastfeeding practices and infant development [35].

Screening for social needs is partly incorporated in South Africa's National Guideline for Maternity Care [8] and the aforementioned Basic Antenatal Care plus Handbook [30]. These guidelines emphasise the importance of documenting a woman's "full and relevant history", which includes family and social circumstances. However, these assessments predominantly focus on issues of food and financial insecurity. Other critical social needs, such as social support, housing stability, employment, and transportation are not addressed. The interconnectedness of women's experience of health, social protection, food and education, suggests that systems to support these needs should be linked effectively, and assistance provided to support pregnant and post-partum women with their navigation.

Ensuring suitable resources have been identified and referral mechanisms are in place before women are screened for social needs has been shown to improve take-up and effectiveness of interventions. This has the potential to bring about substantial reductions in families' reports of unmet social needs and simultaneously yield significant improvements in children's health [36].

Implications

The study has highlighted entry points, often overlooked in conventional health-system-based nutrition responses, that can be leveraged for implementing priority social needs programmes to enhance maternal and child nutrition. The following section outlines four recommendations for implementing these programmes in practice. While the study was focused on addressing the priorities of a specific group of women in Soweto, its recommendations have relevance for any endeavour seeking to foster synergies between systems to improve maternal and child nutrition.

Leverage mutual policy objectives

The Development Plan outlines several interrelated policy objectives, with a particular emphasis on placing adequate nutrition within the first 1000 days of life at the core of accelerating achievement of goals across sectors. These include social protection, health, food and agriculture, and education [21]. The emphasis on early life nutrition across various policy objectives serves as an entry point for implementing synergistic actions and revising system-specific policies and programmes to address the needs of mothers effectively. Scheduled national policy revisions, Voluntary National Reviews assessing progress on the 2030 Agenda, offer routes to policy change and policy commitments across sectors [38]. United Nations Children's Fund's guides on Sustainable Development Goal 2 (Ending Child Malnutrition) outline key asks for governments to consider in their Voluntary National Review [39].

Link systems through multi stakeholder collaboration

Synergistic actions and creating system-wide linkages will require coordinated action across sectors. The Commission acknowledges that multi-sector partnerships are crucial to achieving significant reductions in malnutrition and in accelerating efforts to ensure children thrive [21]. The South African National Food and Nutrition Security Plan 2018–2023 [40] presents an opportunity because it prioritises multisectoral collaboration as a core objective. It suggests establishing a multisectoral advisory council to oversee policy alignment and coordinate programme implementation. Such platforms at national, sub-national and local level can facilitate the development and strengthening of linkages between healthcare, public works, social protection, food, and education sectors around joint programming. Once these platforms are established and opportunities for mutually reinforcing policy objectives have been identified, stakeholders should be involved in programme design and implementation to ensure programmes are accessible and acceptable [38]. These include nonprofit and CBOs, who could be engaged and enlisted to support programme synergies [9].

Public financing for social needs programmes

In South Africa, as in every nation, the allocation of finite public resources amidst competing challenges requires difficult decisions [21]. During the fiscal year of 2023/24, such decisions resulted in a real terms reduction of 4.9% in the health budget, with indications of continued cuts for 2024/25 [41]. The reduction in the healthcare budget disproportionately affects women's access to quality healthcare, as they heavily rely on public services for reproductive and maternal health needs [42], with subsequent adverse impact on their children.

Given this fiscal challenge, the Development Commission's call to "improve the efficiency of these [current] programmes, minimize duplication and ensure they are properly targeted" is ever more important (page 281) [21]. An evident starting point is examining South Africa's chronic underspending. Billions of rands allocated for social programmes are returned to national departments each year. For instance, the Department of Social Development experiences an annual underspending rate of 1% to 2%, amounting to ZAR 1.8 billion (USD 95 million). Similarly, the Department of Basic Education and the National Department of Health also underspend their budgets annually, with 3.1% and 0.9% respectively. At the provincial level, the problem of underspending is even more pronounced. Gauteng, where Soweto is located, recorded significant underspending in the 2021/22 fiscal year, with the health department underspending ZAR 2.7 billion (USD 143 million) of its budget (4.2%) [43].

Through strategic planning and transparent budget allocation the government could be supported in effective resource utilisation and leverage public finances to fund social needs programmes.

Strengthened capacity and collaboration for implementation

For the effective implementation of social needs programmes, our data and others' suggest that investments are needed to improve the capacity and day-to-day coordination of various cadres of staff whose work is interrelated [21]. These include the primary health care workforce that delivers nutrition services, the social service workforce that provides direct outreach, case management and referral services, and those working in the non-profit sector. Despite the recognition of non-profit organisations' pivotal role and heavy government reliance on them in the delivery of vital social and employment programmes, these organisations are currently not integrated into government structures. They faces chronic underfunding and skill deficit [21]. With adequate public funding, there could be collaboration between these three sectors to share capacity building activities, establishing platforms for sharing and analysing information at the local level. This could be reinforced through a clear framework embedded within a policy or join commitments from the relevant ministries.

Strength and limitations

The triangulation of primary data and evidence-based secondary sources was a notable strength in our study, ensuring that proposed social needs programmes were known to be effective and were likely to meet social needs. Additionally, the novelty of the preference

elicitation survey toll offers a sophisticated approach to involving key stakeholder in decision-making processes. By incorporating non-monetary budget experiments and utilizing clear, accessible language and visual aids, the tool effectively elicited nuanced preferences even in communities unaccustomed to such consultations. This innovative approach to preference and value elicitation can be adapted to other contexts.

Further work with stakeholders, particularly with health workers at clinics, might enhance the study's depth and relevance, particularly at an implementation phase. Their involvement could foster a sense of ownership and collaboration, ultimately contributing to the successful uptake and sustainability of the identified social needs programmes.

Limitations in our study include the absence of a cost analysis for implementing the proposed social needs programmes. While our focus was on programme design and identification of priority actions, this absence leaves a critical gap in understanding the practical implications and sustainability. Future research could determine the return on investments through economic modelling studies.

Conclusion

Despite the provision of services and resources designed to improve maternal and child nutrition, unmet social needs hinder women from fully benefitting from such services. Programmes that address the social needs of pregnant and postpartum mothers, a vulnerable group, may enable them to use existing services more effectively. Community members have valuable suggestions and are able to prioritise ways of enhancing or complementing existing services to maximize nutrition benefits. Successful and systematic engagement with the community, listening to their voices and incorporating their suggestions into policy may ensure services achieve their intended nutrition outcomes. Strengthened multisectoral and multistakeholder engagement, efficient allocation of public funds, and enhanced implementation capacity of relevant workforces will all facilitate the implementation of social needs programmes to enhance the nutrition impact of existing services.

Abbreviations

CBO Community-based organisation
CSG Child Support Grant
FGD Focus group discussion

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

Supplementary Material 3

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Authors' contributions

AE conceptualised the study with input from CD, KH, MB, and NJC. AE, NJC, and CD designed the data collection tools. AE analysed the data with input from NJC and CD. AE guided data analysis and interpretation, with input from all co-authors. AE drafted the manuscript, and all co-authors edited the manuscript and approved the final version.

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Availability of data and materials

The dataset generated and analysed during this study is not publicly available due to ethical approval limitations regarding participant confidentiality. However, it is available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approvals were obtained from the University of the Witwatersrand Human Research Ethics Committee (M210718) and the Research Committee of Johannesburg Health District (GP_202110_002). All participants were informed that participation in the study was voluntary and reassured about the confidentiality of the data collected. All participants gave their informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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