JAN
Leading Global Nursing Research

Integrated person- and people-centred primary care for diabetes in low- and middle-income countries: the nurses' perspective on patient needs.

Journal:	*Journal of Advanced Nursing*
Manuscript ID	JAN-2022-1747.R2
Manuscript Type:	Empirical Research Mixed Methods
Keywords:	Diabetes, Primary Care, Conceptual Models of Nursing, Health Services Research, Inequalities in Health, Transcultural Nursing, Community, Nurse - Patient Relationships
Category:	Nursing

Integrated person- and people-centred primary care for diabetes in low- and middle-income countries: the nurses' perspective on patient needs.

ABSTRACT

Aims: To identify what nurses working in primary care settings perceive as necessary to support the life needs of people with type 2 diabetes. Articulate these needs with the needs expressed by people with diabetes in a previous study. Finally, illustrate the potential of the used method.

Design: A highly structured qualitative group method for brainstorming and idea sharing was used to generate a participant-owned concept map that can support and evaluate practice change.

Methods: Data were collected between April and May 2022 in two public primary health care centres in Sacaba, Bolivia, with 33 professional nurses, technical nurses, nurse trainees and one physician. The concept mapping process by Trochim was used to generate, share, and structure ideas, maximizing equality of input.

Results: The nurses identified 73 unique needs that were structured in 11 conceptual clusters related to four different stakeholders or domains: organization of care and health policy, strengthening knowledge, skills, and attitudes of health care providers, empower people living with diabetes and their family, and community level health promotion and diabetes education.

Conclusion: The needs and domains identified by nurses and people with type 2 diabetes are very similar and inform a multisectoral and transdisciplinary action plan to jointly monitor and evaluate progress towards people-centred care for people with diabetes.

Impact: This study demonstrates nurses´ important contribution to analysing and designing people-centred care in their community. They identify and act upon social determinants of health related to schools, safety, and legislation. Besides global relevance, results inform the municipal health plan and an ongoing research project on cardiometabolic health.

Patient or Public Contribution: Data from prior patient consultations were included in the study design, and study results inform the municipal health plan.

Key words: [Diabetes Mellitus, Primary Health Care, Nursing, Health Services Needs and Demand, Social Determinants of Health, Traditional Medicine, Patient-Centred Care, Community Participation, Bolivia, Public Health]

SUMMARY STATEMENT

What already is known:

- Risk factors for diabetes and obesity like stress, unhealthy diets, decreased physical activity and alcohol use are associated with social determinants of health.
- The bulk of people with diabetes live in low- and middle-income countries, 80% are younger than 65 years.
- Health systems based on comprehensive, integrated and community-oriented primary care are better equipped to face the growing burden of non-communicable diseases.

What this paper adds:

- Nurses working in this multicultural primary health care setting perceive a broad range of actions and resources needed to support people living with type 2 diabetes which reflects their understanding of the comprehensiveness of care and the need to work with the whole person in his family, community, and population context.
- Nurses and people with type 2 diabetes in Bolivia perceive self-care and self-monitoring as less important than skilled and knowledgeable health education to the person with diabetes, his family, and the community in general.
- A need for protocols leading to uniformity of diagnosis and treatment plans was perceived by the nurses in this study as well as by people living with type 2 diabetes.

Implications for practice/policy:

- Countries need effective information systems to collect, monitor and analyse health data related to the prevalence of diabetes, its risk factors including social determinants of health, and complications.
- Nurses and other primary health care providers in low-and middle-income countries need training, clinical practice guidelines, supplies and an adequate regulatory framework to prevent type 2 diabetes and its complications.

- Beside knowledge and skills training, nurses need to be given time and a physical space to be able to provide health education.

INTRODUCTION

Type 2 diabetes (T2D) is a rising global health problem that currently affects approximately 537 million adults (20-79 years) worldwide (IDF, 2021). Obesity forms a twin epidemic with diabetes through direct interaction as well as through shared risk factors (Verma & Hussain, 2017). The steep increase in both health problems is directly related to stress, sleep, unhealthy diets, decreased physical activity and alcohol (Safaei et al., 2021). These lifestyle factors are related to many upstream causes (Walker et al., 2016). Some social determinants of health (SDH) are well studied, like urbanisation and socioeconomic factors, while others are still barely understood, like neighbourhood, environment, and cultural drivers (Dendup et al., 2018; Marmot, 2010). Diabetes disproportionally affects low- and middle-income countries (LMICs), where approximately 79% of people with diabetes live. The social, financial and development implications are also greater, with over 80% of people with diabetes in working age (younger than 65 years), while this is only 44% in high-income countries (Cho et al., 2018).

Integrated person-and people-centred health (IPPCH) services are organised around people's health needs and expectations rather than diseases. The term 'People' is used here to refer to the collective risk factors and resources, while 'person' is used to refer to the interpersonal relationship and the whole person (De Maeseneer et al., 2012; WHO, 2015). A strategic way to implement IPPCHS is by strengthening primary health care (PHC). Historically, PHC in LMICs was focused on non-integrated "vertical" or stand-alone programs focused on specific disease or care delivery areas like tuberculosis or children under 5 years old (Bitton et al., 2017). Only recently, guided by the universal health coverage strategy, PHC in LMIC is becoming more inclusive, giving access to the whole population, and comprehensive, considering the whole person. The 30 by 2030 campaign promotes a shift from "vertical" to "diagonal" investment. They urge major donors that invest in specific health conditions such as HIV, diabetes, or mental health conditions in low- and middle-income countries to channel 30% of their investment to strengthen primary healthcare services (De Maeseneer et al., 2020). Health systems based on comprehensive, integrated and community-oriented primary care (COPC) are better equipped to face the growing burden of non-communicable diseases (Bitton et al., 2017).

Integrated people-centred health care considers a broad range of variables that influence health. The social gradient in health, the lower a person's social position, the worse his or her health, calls for recognition of these upstream SDH (Marmot, 2010). Many of these SDH are not systematically collected, analysed, and addressed (Nundy et al., 2022). Universal health coverage is unsustainable if the SDH, including health literacy, are not dealt with, even in high income countries. People in the community and their primary health care providers, who often work and live in these communities, have a pivotal signalling role in identifying and revealing determinants that adversely affect the health of their population. A shift in nursing tasks is needed from mainly providing technical assistance within medical institutions to building partnership with community members. Nurses can become change agents with advanced skills, knowledge, and competencies to enhance health literacy, motivate community members and engage in collaborative community partnerships (Kamei et al., 2017).

To strengthen primary health care and apply IPPCH care, it is necessary to know and respond to the direct and indirect needs related to the health of people rather than to focus exclusively on episodic in-service care (De Maeseneer et al., 2012; WHO, 2015). The evidence on the needs of people with T2D that can support more effective and comprehensive diabetes care in PHC comes predominantly from high-income countries and specialized nurses or physicians (Flood et al., 2020). In 2019, people with T2D in a LMIC were consulted on their needs to live well with diabetes (Leyns et al., 2021). A perspective of generalist primary care nurses, who often are closest to the community they serve and form the bulk of healthcare providers in LMICs, can complement this needs assessment. Nurses play a crucial role in person- and people-centred care, and evidence shows that being actors in this type of care improves not only the satisfaction of their patients but also their work satisfaction (Lateef & Mhlongo, 2020).

Background

The Plurinational State of Bolivia, a low- to middle-income country (LMIC) in South America, has the largest proportion of indigenous people in its region, estimated at 62% in 2010 (ECLAC, 2014), speaking 36 officially recognized languages. In 2008, the intercultural family and community (SAFCI*: Salud Familiar Comunitaria Intercultural*) health policy was introduced with four pillars: community participation, comprehensiveness, intersectorality, and interculturality. Through this health policy and the law on traditional medicine (2013), efforts are

made to make healthcare services more culturally appropriate (Rodriguez et al., 2021). The historical contempt for traditional medicine, which is part of the culture of most Bolivian people, led to distrust in the official healthcare system and to people refraining from seeking healthcare (Fernández Juárez, 2020).

In February 2019, Bolivia introduced a public universal health insurance (SUS: *Sistema único de salud*), providing a broad health service package to the whole population. Prior, care was limited to people over 60, younger than five, pregnant women, and some "vertical" programs like tuberculosis, chagas and sexual and reproductive health (Rodriguez et al., 2021). This universal health insurance improved access to health care for the working-age population, including people with T2D. There are no current data available on the prevalence of T2D in Bolivia. In 2001, the prevalence in the main urban regions was estimated at around 7.2% in 2001. A recent study between July 2015 and November 2016 in the department of Cochabamba registered a high level of diabetogenic risk factors with a low level of physical activity (64.77%), overweight (35.84%), obesity (20.49%) and raised blood pressure (17.5%). This suggests a rise in the prevalence of T2D since 2001 (Mamani-Ortiz et al., 2019). Although there are no data on diabetes complications in Bolivia, an expert panel analysed data on complications and control of diabetes in LMIC. Related to control, only two out of five patients reached the treatment target of HbA1c < 7% within the first 5 years after diagnosis, while this was only reached for one out of four or fewer after that. One out of three presented complications within 5 years after diagnosis, while this escalated to over half later on. The expert panel recommends intensifying diabetes treatment as soon as possible, including access to insulin and patients' education and other measures to prevent diabetes complications (Aschner et al., 2021).

In a study performed between March and May 2019, access to health care services was, notwithstanding its recent free access, perceived as rarely present for people living with type 2 diabetes. This low appraisal was related to a perceived lack of access to a nutritionist, specialized care, and long waiting times. This prior study identified resources and unmet needs identified by people living with T2D in a mixed peri-urban rural municipality of Bolivia. The lion's share of needs identified was situated at the primary healthcare level: self-care supported by knowledge and skills, support by well-prepared healthcare providers in a socio-cultural and linguistically sensitive way and community participation (Leyns et al., 2021).

Including an assessment of the life needs of people with T2D from the PHC expert perspective of nurses is complementary to the prior study and creates a commitment for change at this level of care. The reflection creates ownership of the actions needed for people-centred care, an approach to care that consciously adopts individuals', carers', families', and communities' perspectives as participants in, and beneficiaries of, trusted health systems that respond to their needs and preferences in humane and holistic ways (WHO, 2015). Nurses comprise 50% of health professionals worldwide and are essential to primary health care and health education (WHO, 2022). In Bolivia, there are two nursing careers, a technical nurse, with a 2-year qualification, and a professional nurse, with a full-time 5- year qualification. The technical nurse engages in basic nursing tasks, health promotion and disease prevention, while the professional nurse participates in health care, academic teaching activities, research, and administrative tasks. This study explores what technical nurses, professional nurses, and trainees of both nursing careers perceive as needed to provide person- and people-centred care to people with T2D and compares this perspective with the perspective of people living with T2D collected in 2019.

Additionally, the study presents a participative method that facilitates the input, process, and outcome towards people-centred care planning.

THE STUDY

Aims

The aims of this study are threefold. First, to identify what nurses working in primary health care settings in a multicultural LMIC perceive as needed to support the life needs of people living with T2D in their communities; secondly, to explore their perspective on the needs identified by people with T2D in their communities and thirdly, to illustrate the potential of concept mapping for needs assessment with different stakeholders.

METHODOLOGY

Design

The Concept Mapping methodology developed by Trochim (Kane & Trochim, 2007) is a qualitative method, using a nominal group technique for brainstorming and idea sharing that informs a survey to structure the generated ideas and rate their importance and presence.

Participants

Participants were selected from Sacaba, a mixed peri-urban rural municipality that is currently developing a "healthy municipality" plan. For logistical reasons and to guarantee the presence of sufficient and diverse nursing personal, participants were selected from the two largest primary health centres (Quintanilla and San Juan de Dios), which together attend to nearly half of the municipal population. Each health centre attends to rural and peri-urban communities, of which 60% speaks Quechua and Castellano, while one out of five, mostly the elderly, only speak Quechua (Rodriguez et al., 2021). As such, all personal of both health centres attend people that only speak Quechua.

For the three brainstorming workshops in April 2022, all professional and technical nurses and a random sample of eight out of 27 nursing trainees were invited to participate. A total of 27 nurses agreed to participate, including all seven professional nurses (5-years training), 12 of the 15 technical nurses (2-year training) and the eight invited nursing trainees. Although not invited, one physician, the director of San Juan de Dios, also participated in one of the brainstorming sessions.

For the questionnaire rating in May 2022, all 27 participants of the brainstorming session were invited but only 15 were able to participate. Seven of the nursing trainees and one technical nurse left the health care centre by May 2022, however two of the nursing trainees that had left were still willing to fill in the questionnaire. Additionally, six nurses of the same health centre were invited and agreed to participate, bringing the total to 21. The questionnaire's statements were sorted by10 volunteers.

Data collection

The Concept Mapping methodology developed by Trochim (Kane & Trochim, 2007) was used to promote equal participation of all participants despite the traditional hierarchy and to create an interpretable conceptual framework to inform clinical and policy advice. The methodology consists of six steps, as seen in Fig 1. The first three steps focus on data collection, while the latter three steps are part of data analysis.

Figure 1: The process of concept mapping (Adapted from Kane & Trochim, 2007)

Step 1: Preparation

The concept mapping process stands or falls with the meticulous formulation of the seeding statement that inspires a comprehensive set of answers during the brainstorming workshops, see Fig 1.

The rating questions are to evaluate the statements on a 5-point Likert scale:

- *'How important do you think the following statement is?' (Importance)*

1 = 'not important', 2= 'preferable but not important', 3= 'important', 4= 'very important', 5= 'essential'.

- *'To what extent do you experience that the following statement is already present in your day-to-day work?' (presence).*

1= 'not/ never present', 2= 'rarely present', 3= 'sometimes present', 4= 'mostly present', 5 = 'always present'.

Step 2: generating statements.

Three independent brainstorming sessions were organised with the intent to reach saturation. Brainstorming sessions were held over the nurses´ lunch break, lunch was provided, which led to informal exchange and created a relaxed atmosphere. Subsequently, an explanation of the course of the session was given, informed consent forms were signed, and participants' doubts were answered. The seeding question was presented, and participants were asked to think and write down at least five ideas as a single phrase independently to guarantee input from all participants. Subsequently, a nominal group technique was used to facilitate sharing of the brainstormed ideas. In this technique, each participant shares only one of their ideas with the group at each round to avoid a minority of participants are dominating and directing the input. Rounds were held until all ideas, including new ones that were generated hearing the statements of others, were addressed. All ideas were formulated in statements that were projected and were when necessary reformulated to guarantee their clarity for all participants or split in two when they represented two ideas. This reformulation avoids bias in the rating of each statement. See Step 3. Additional rounds of brainstorming were induced after presenting the statements described in Table 1 to the participants.

Table 1 Summary of needs expressed in 2019 by patients with T2D in Sacaba, Cochabamba, Bolivia (adapted from C. C. Leyns et al., 2021).

Table 1 summarises the needs expressed by people living with T2D in Sacaba in 2019 (C. Leyns et al., 2021). Based on this table, more ideas were presented, which assisted in meeting the second aim of this study, articulating their perceived needs with the ones expressed by people with T2D.

Step 3: structuring statements: Rating and sorting

A questionnaire with 73 statements was constructed from the 142 original ideas generated in the three workshops. Duplicate or very similar ideas were merged, and some still with multiple ideas were split. Two researchers independently constructed a final list, then they worked on a consensus list, which five additional researchers evaluated. This way, the questionnaire represents as authentically as possible all the ideas expressed during the brainstorming workshops. This questionnaire was rated on importance and presence, see step 1. Although nine of the 21 questionnaires had some missing answers, they were still included in the analysis. 10 volunteers working in health care sorted the 73 statements in different piles in a way that made sense for them. Each pile was given a name to inspire the naming of conceptual clusters, see Step 5.

Data analysis

The last three steps of Concept Mapping are the visual representation of statements in a concept map, the interpretation of this map and its implementation.

A visual representation of the rating and sorting of the statements is facilitated by the free software program R-CMap (https://haimbar.github.io/RCMap/). The place of the statements on the map, see small black numbers on Fig 2, depends on the times a statement was sorted together in the same pile and, as such, has some conceptual similarity. Using the 'Euclidean Distance', the software uses multidimensional scaling to represent a matrix of distances (or dissimilarity) between the statements on a bidimensional figure. Statements closer together are grouped in clusters, using the cluster method 'Ward.D'. See 15 polygons in Fig 2.

S*tep 5* is the revision and interpretation of the map which led to merging two clusters and dividing three clusters between related ones, bringing the total number of clusters back to 11. The researcher determines the final number of clusters based on the conceptual coherence of the clusters. Additionally, eight statements were moved to more appropriate clusters, see Fig 2. Each

cluster is labelled, and regions on the map with related labels are joined in domains. Clusters that belong to the same domain are encircled and numbered in the same colour.

Figure 2: Interpreted Concept Map with the perceived needs of nurses to support the life needs of people with T2D.

The 15 filled polygons with a number in the middle are the original clusters formed by the RC-Map program. The 11 unfilled forms with a big number are the revised clusters. Different background colours identify domains. The small numbers represent the statements.

The rating input from the questionnaires was used to calculate the average rating per statement or per cluster. The combination of both ratings, importance and presence is visualized on a two-dimensional graph which can assist in determining the Go-Zone, statements with higher importance and lower presence than the average, see Fig 3. The statements in this zone may be prioritized in an intervention plan as part of *step 6*, implementation. Figs 2 and 3 were used to produce a one-page document with clinical practice and policy advice for local stakeholders.

Ethical considerations

All activities were approved by the ethical board of the Ghent University Hospital (Belgian registration number: B6702022000149). All study participants were informed and signed an informed consent form.

Rigor

The collection of all written statements and the use of the nominal group technique guaranteed equality of input. Even when statements were not shared with the group by the participant, the written statements were read out and validated for intent and comprehension. The reliability of the survey can be assumed since the majority of the nursing personnel participated in brainstorming and filled in the questionnaire. The questionnaires varied in the statements' order to reduce fatigue's effect. Both health centres received the final concept map, its interpretation, and median ratings to check for any incoherence with their perceptions. The fieldwork was described in as much detail as possible and assessed by external student researchers. All materials are available upon request.

FINDINGS

Socio-demographic data

A total of 34 people participated in either the brainstorming sessions, the questionnaire or both. Since only 56% (n=15) of the nurses that participated in the brainstorming (n=27 and 1 physician) filled in the rating questionnaire, 6 additional nurses were invited and participated in the rating. Nine questionnaires had some missing data. Participants were aged 19 to 51 years, 88% (n=30) were female, all spoke Castellano, 73.53 % (n=25) spoke Quechua. 71% of the participants were from indigenous origin based on their parents speaking an indigenous language at home, for 65% (n= 22) this was Quechua and for 6% (n=2) this was Aymara. The participants' working conditions were mostly unstable, with 60% (n=20) on a temporary yearly renewable municipal contract without social benefits, 20% (n=7) with a contract related to the program Mi Salud – SAFCI with some social benefits and work security and 20% (n=7) with a fixed contract called item with social benefits and work security. Their socio-demographic data are summarized in Table 2.

Table 2: Description of study participants.

**Contract: SAFCI = Staff Mi Salud-SAFCI, item= fixed contract, temp. = temporal municipal contract.*
*** Indigenous: nurses that speak an indigenous language as their mother tongue, all participants speak Castellano/Spanish*

Go-zone.

Statements rated as more important than the mean importance rating for all the statements ($\bar{x}$ = 3.9) and less present than the mean presents rating for all the statements ($\bar{x}$ = 2.8) are positioned in the go-zone. This is the region bottom right in the four graphs in Fig 3. For example, in the bottom right graph, the go zone contains the green number 36, which represents ´ exclusive staff trained to care for patients with diabetes´. The means stated here are the means considering all the participants, while the means presented in Fig 3 are from subgroups. The figure shows a lower perceived presence of the statements by older (>25 years) and indigenous participants.

Figure 3: Go Zones based on ethnic identification based on parental language and age above or under 25.
The lines in the graphs are the mean ratings for the presence (horizontal line) and importance (vertical line) for all the statements rated by a subgroup. Top left = subgroup with an indigenous

first language; top right =subgroup with Castellano as first language; bottom left = subgroup younger than 25; bottom right = subgroup older than 25.

Domains and clusters structuring the perceived needs for diabetes care.

Fig 2 is the visual representation, and Table 3 contains the labels of the 11 conceptual clusters and their four overarching domains. In the table, two statements are presented for each cluster. The number at the end of each domain or cluster between parentheses represents the number of statements they contain. The columns after the statements are the mean ratings (=$\bar{x}$) and standard deviation (=σ), respectively, for importance and presence for each statement, cluster and domain with an accuracy of one decimal. In the following paragraphs, each cluster name is preceded by a number between parenthesis, corresponding with the coloured cluster number on the concept map (Fig 2).

Table 3: Ratings of domains, clusters, and statements to support the life needs of people with T2D from a nurse's perspective.

Four domains (upper case) with corresponding clusters (bold); the number between parentheses at the end corresponds with the number of statements in each domain or cluster. $\bar{x}$=mean value based on the rating of all participants; σ=standard deviation of the mean.

Organization of care and health policy

This domain contains four clusters and nearly half of all statements. For cluster (1), a primary health care-based diabetes program (importance: $\bar{x}$=3.8, σ=0.9), all the statements have a mean rating from very important to essential. The highest rated statements were ´to create a diabetes program, including protocols, within the health system´ (importance: $\bar{x}$=4.2, σ=0.8), ´a nutritionist who deals with people with obesity or diabetes´ (importance: $\bar{x}$=4.0, σ=0.8) and ´create a form or register that can be given to people with diabetes so that they can write down their glucose (and blood pressure) measurements´ (importance: $\bar{x}$=3.7, σ=0.7). For the cluster (2) to facilitate physical access to diabetes care (importance: $\bar{x}$=3.8, σ=0.8), the highest rated statement was ´a nursing consultation room where there is enough time to educate people with chronic diseases (such as diabetes) ´ (importance: $\bar{x}$=4.1, σ=0.8). The cluster (3) adequate working conditions, equipment, and supplies (importance: $\bar{x}$=3.9, σ=0.9) contained most statements and were related to glucose measurement for timely diagnosis and periodic

monitoring, continuous availability of drugs, including insulin, ´incentives for healthcare staff to do a good job´ (importance: $\bar{x}$=4.0, σ=0.9) and ´the equipment of community-based consultation rooms´ (importance: $\bar{x}$=4.1, σ=0.8). The three highest-rated statements of the cluster, (4) regulations to promote healthy lifestyles (importance: $\bar{x}$=3.7, σ=1.1), were ´economic access to healthy food´ (importance: $\bar{x}$=3.7, σ=0.9), ´Increasing safety on the street to be able to walk (dogs on a leash, no thieves)´ (importance: $\bar{x}$=3.9, σ=1.1) and ´regulate the sale of junk food in schools and promote nutritious foods´ (importance: $\bar{x}$=3.8, σ=1.1).

Strengthening knowledge, skills, and attitudes of health care providers

The cluster related to knowledge, (5) training of nurses and other human resources on diabetes care and health promotion, has all but one statement with a mean importance rating over four and a standard deviation under 1. The exception was ´nurses with knowledge about which medicinal plants can be taken as part of diabetes treatment´ (importance: $\bar{x}$=3.5, σ=1.2). Two statements were related to how to provide health education and guide people in what they should eat, and three related to capacitation about diabetes, specialization and effects of medication used in diabetes. The cluster related to attitude and emotional support, (6) provide humanized care including mental health (importance: $\bar{x}$=3.9, σ=0.9) had as highest rated statements, ´providing warm, humane care to the patient´ (importance: $\bar{x}$=4.2, σ=0.9; presence: $\bar{x}$=3.4, σ=1.4) and ´psychological support from the health staff to people with diabetes.´ (importance: $\bar{x}$=3.9, σ=1.0; presence: $\bar{x}$=2.7, σ=1.2).

The cluster ´ (7) lifelong cultural appropriate care support´ (importance: $\bar{x}$=3.5, σ=1.0), is the most divergent one in the concept map, see Fig 2, meaning that the statements have been grouped in many ways. The highest-rated statements are related to continuous access to basic information for people with diabetes, adherence to therapy and periodic laboratory tests (importance: $\bar{x}$=3.7, σ=0.9). The other statements are related to food and medicinal plants, like ´avoid that health care provider or people, in general, prohibit people with diabetes to eat potatoes, grains, or fruits´ (importance: $\bar{x}$=3.3, σ=1.3).

Empower people living with diabetes and their family.

The cluster (8) peer and family support for people with diabetes (importance: $\bar{x}$=3.7, σ=0.9) had as highest rated statement ´to involve the families of people with diabetes in education´ (importance: $\bar{x}$=3.9, σ=0.9) and ´self-help groups for people with diabetes, where they can share experiences´ (importance: $\bar{x}$=3.7, σ=1.0). For the cluster, (9) promote self-management through patient education and motivation (importance: $\bar{x}$=4.0, σ=0.8), the highest rated statements were ´educate people with diabetes about diabetes and possible complications´ (importance: $\bar{x}$=4.2, σ= 0.7), ´inform people about the types of diabetes (type 1 and type 2)´ (importance: $\bar{x}$=4.2, σ=0.8) and ´provide information about healthy nutrition for people with diabetes´(importance: $\bar{x}$=4.1, σ=0.8). The lowest rating was given to ´motivate self-control for people with diabetes´ (importance: $\bar{x}$=3.8, σ=0.9).

Community level health promotion and diabetes education

The last domain is related to community- or population-level interventions. One specifically related to diabetes, (10) community education on diabetes prevention (importance: $\bar{x}$=3.9, σ=0.9) with as highest rated statement: ´organizing fairs, campaigns, or lectures for the population to promote health and prevent diabetes´ (importance: $\bar{x}$=4.2, σ=0.8) and ´educational conversations at the neighbourhoods about diabetes and its care´ (importance: $\bar{x}$=4.0, σ=1.0).

The other cluster is on health promotion, (11) Strategies to improve lifestyle habits in the community (importance: $\bar{x}$=3.9, σ=0.9) with as highest rated statements: ´improve eating habits during pregnancy and early childhood´ (importance: $\bar{x}$=4.2, σ=0.8), ´working with schools on health promotion and diabetes prevention´ (importance: $\bar{x}$=4.0, σ=0.8) and ´implement the use of complementary foods for people with diabetes (ex. CN diabetic milk) ´(importance: $\bar{x}$=4.1, σ=0.8).

Needs identified by nurses versus needs identified by people with T2D.

Some of the ideas mentioned above were inspired by the perspectives of people with T2D collected in 2019, see Table 1. This summary was presented to the participants after the initial idea-sharing rounds and elicited additional statements related to the use of medicinal plants, emotional support and safe streets, which nurses rated as important to essential. Examples are ´people with diabetes may take medicinal plants or natural remedies (like coca, boldo leaves or llama meat) as part of their treatment´(importance: $\bar{x}$=3.4, σ=1.3) and ´conduct scientific research to find out which medical plants work in the treatment of diabetes´(importance: $\bar{x}$=3.6,

σ=0.8) related to cluster 7; ´psychological support from the health staff to people with diabetes´ (importance: $\bar{x}$=3.9, σ=1.0; presence: $\bar{x}$=2.7, σ=1.2) related to cluster 6 and ´increasing safety on the streets to be able to walk (dogs on a leash, no thieves) ´ (importance: $\bar{x}$=3.9, σ=1.1) related to cluster 4. The domains from the consultations with people with T2D and the domains in this study are nearly identical.

DISCUSSION

The aim of this research was to identify nursing needs, articulate those needs with needs of people with T2D and to illustrate the potential of the concept mapping method. The nurses participating in this research appreciated the comprehensiveness of care including prevention, health promotion, cure, and care, and acknowledged the whole person in his family, community, and population context. They formulated needs that were sorted into four dimensions: organisation of care and health policy; strengthening knowledge, skills, and attitudes of health care providers; empower people living with diabetes and their family, and community level health promotion and diabetes education. These needs were similar to patient needs identified in previous research, which were subdivided into the following dimensions: self-management; health care providers; health system; and community (Leyns et al., 2021). The results demonstrate that nurses working in this multicultural LMIC primary health care setting and people with T2D (Leyns et al., 2021) identify a broad range of actions and resources they perceive as necessary to support the needs of people living with T2D. The results also demonstrate the strength of the concept mapping method in eliciting a rich output, that as described further on can support clinical practice and health policy planning and monitoring (Grewal et al., 2021; Urbanoski et al., 2020).

People-centred care requires that people have the education and support they need to make decisions and participate in their care (WHO, 2015). People need to know how to navigate the health system, a need identified by both people with T2D (Leyns et al., 2021) and nurses, although as less present by people with T2D. Both stakeholders seemed to have doubts about self-care. Nurses identified the need to motivate people for self-care, but gave it a lower importance than patient education, notwithstanding its essential role (Kamei et al., 2017; Morris et al., 2022). People with T2D gave a lower-than-average importance rating to the statements: ´having a journal to register and follow up foods, symptoms, blood sugar… daily´ and ´having

the capacities to control a device to check blood sugar´ (C. Leyns et al., 2021). This can be related to a different world view, time and resource constraints or lack of specific knowledge. The need for knowledge training is illustrated by the statement on prohibiting people with diabetes from consuming foods like potatoes, cereals, or fruits like bananas (importance: $\bar{x}$=3.3, σ=1.3; presence: $\bar{x}$=2.8, σ=1.1). Nutritional advice needs to be aligned with ADA guidelines (ElSayed et al., 2023) rather than ban certain foods such as potatoes that form a major source of nutrition for Bolivians. People cannot follow this advice and get demotivated (Morris et al., 2022). PHC providers are not trained to deal with non-communicable diseases. To work in the public health system, they must attend courses on health legislation, programs like vaccinations, chagas, tuberculosis, rabies, … and the indigenous language of their region. However international guidelines exist, they are not accessed by health care providers and no clinical practice guidelines for PHC related to diabetes exists. Current norms prohibit PHC providers from initiating or changing treatment for people with T2D and to use insulin (Rodriguez et al., 2021). There is a need to shift the care for T2D from the hospital to the primary care level. Both PHC providers and people with T2D will need support for this transition, since also de later are strongly focused on emergency and specialized care (Leyns et al., 2021).

The SAFCI health model, introduced in 2008 to make health care more inclusive, can support this transition. Its focus is on working with families and communities in a culturally sensitive way at the first level of care. Since the introduction of this model each PHC centre is expected to organize a health council. This council, comprised of a representative of each community, controls the functionality of the health centre and signals health (related) problems in their community to the PHC centre. The president of each health council participates in the municipal health association. The board of directors of this association together with a municipal health director and the local health network coordinator are responsible for all municipal decisions related to health. Three times a year, these community representatives, a health care provider from each health care centre and municipal authorities participate in a 2-day meeting to evaluate and work on the municipal health plan. Many PHC centres are represented here by a professional nurse. They herein have the same voice and vote as any other community or health representative. This structure helps to address community needs and underlying determinants of health (Rodriguez et al., 2021). Although a functioning health council is mandatory, no mention of this resource was made in this study. People with T2D did identify the need for a more

proactive role for the community and its community councils (Leyns et al., 2021). The role of communities in this study was seen as receptor of health education related to healthy lifestyles or diabetes. Despite the greater proportion of indigenous staff, 60% in this study, the medical culture in Bolivia is still partly paternalistic (Fernández Juárez, 2020). Although wordings as "educational conversations with neighbourhood councils" and "home visits to get into people's circle of trust", suggest a shift towards a more horizontal relationship. There is a willingness to work in the community; nonetheless it is seldom feasible due to the high demand for in-service care.

This interest in evolving towards a more horizontal collaborative relationship between two motivated people facilitates behavioural change (Morris et al., 2022). Apart from a warm empathic attitude, identified by both nurses and people with T2D, some skills are necessary to engage in an intercultural dialogue like the ability to speak Quechua. Since 2008 (SAFCI) all healthcare providers are obliged to speak the indigenous language of their study region (Rodriguez et al., 2021). Interestingly nine of the 34 participants mentioned not to speak Quechua, six of them were students. A positive attitude is related with working conditions, like workload, social benefits and, as mentioned in this study, incentives to do a good job. The needs of both persons in the interaction, the patient, and the healthcare provider, are essential for providing high-quality equity-focused care (Nundy et al., 2022). Nurses identified more needs related to organization of care, with the largest clusters on adequate working conditions, equipment, and supplies.

A need for a primary health care-based diabetes program was identified by people with T2D and nurses. Nurses are expecting a change in norms and the introduction of protocols, while people with T2D feel the need for uniformity of diagnosis and treatment plans by different healthcare providers. An essential element of this program will be to capacitate PHC providers in diabetes management and prevention. Timely recognition of risk factors will allow for timely diagnosis and directed screening (Morris et al., 2022). A population screening for type 2 diabetes has an uncertain impact on all-cause mortality (Peer et al., 2020). The integration of this program as part of general primary health care strengthening and the cost of this program must be considered for its sustainability. An example of a low-cost and acceptable screening method is the measurement

of glucose levels in urine, with high sensitivity 2 hours after the oral intake of 75g of glucose, are needed (Shinozaki et al., 1999).

The experience with non-integrated standalone programs leads the idea of implementing a food supplement like enriched milk for people with diabetes (importance: $\bar{x}$=4.05, σ=0.8). In Bolivia, the elderly and children under the age of two receive monthly enriched food supplements. The risks of implementing food supplements for people with T2D is inequity by disease, making people want to be diagnosed with diabetes to get the food supplement, and the omission of nutritional education. As proposed in this study, population strategies to improve healthy eating with specific groups like schools or the general population can probably have a greater impact on sustainably improving eating habits (de Maeseneer et al., 2020).

This study shows that to achieve care adapted to the life needs of people living with T2D, resources must be mobilized at different levels by various stakeholders. The perspectives between stakeholders vary, showing the importance of measuring progress from different perspectives (Grewal et al., 2021).

Strengths and Limitations

For the brainstorming workshops, all participants were encouraged to write down their ideas individually, decreasing group thinking and reductive communication. Hearing ideas from others prompted participants to generate additional ideas, an advantage of the group process.

Notwithstanding that there was a certain hierarchy in the group, the sequential sharing of a single idea and the inclusion of all written statements diminished its effect. The participation in the second brainstorming session of a physician was experienced as cordial and respectful, though had an influence on some of the statements included in the questionnaire.

The rating questionnaires were handed to the nurses when they had a high workload due to the start of the infection season. This may have led to little variance in ratings in some of the questionnaires raising doubt about their accuracy. As such, this article puts more emphasis on the statements generated than its ratings. No information was gathered on patient outcomes like risk factors, diabetes control or complications. A study in Sacaba on population risk factors and prevalence of hypertension and diabetes is planned to start in April 2023.

Recommendations

The results of this study facilitate a dialogue between people with T2D, health care providers and municipal authorities to agree upon concrete actions to include in the municipal health plan. Recommendations related to data management, clinical practice, education, and research were formulated and presented to the local actors. Related to data management there is an urgent need to have reliable data on the prevalence of diabetes, its risk factors including social determinants of health, and complications. Current data suggest a high prevalence making it necessary to adjust Bolivian legislation to allow the diagnosis, follow-up, and treatment of T2D to take place largely at the first level of care. Nurses have an important role in managing diabetes and preventing complications for which they need time as well as a place to provide health education. This education is based on the combination of knowledge to manage T2D and communicational, motivational and leadership skills to educate, motivate and create community partnerships. Research that explores the local diets, its cultural drivers, and ways to foster a healthier diet in LMIC, as well as the development and implementation of local clinical practice guideline for diabetes can strengthen the evidence base of current practice.

CONCLUSION

Integrated person- and people-centred health care is based on a shift from a disease orientation towards a health orientation (WHO, 2015), from a hospital focus to a primary healthcare and community focus and from standalone health issues to integrated care. The concept mapping method used in both studies facilitated the generation of advice for clinical practice improvement and policy development.

Public health and the knowledge of SDH are strongly ingrained in the Bolivian health system. Nurses are aware of the upstream causes that affect health, like local food culture, education, and poverty. Primary health care related to interpersonal relationships and community partnership are newer concepts identified in both studies as the need for warm, human person-centred care. The relational component is an important step towards self-care and shared decision-making. Public health and PHC are central to people-centred care, which needs input and output from the community, local authorities, and healthcare providers. These stakeholders can articulate clinical, policy, and contextual evidence to tackle health problems more effectively and contribute to social cohesion, patient satisfaction, and job satisfaction for care providers.

This research has been conducted locally with results that inspire local interventions related to the municipal health plan, but also provide results and a consultation process applicable in many settings. It can inspire other countries and settings to analyse how people-centred their health systems, clinical practices, and guidelines are and how prepared their nursing staff is to take on the role of change agent to enhance health literacy and partnership with communities.

Abbreviations

IPPCH: Integrated person and people-centred health

LMICs: Low- and middle-income countries

PHC: Primary Health Care

SAFCI: intercultural family and community health/ *Salud familiar comunitaria intercultural*

SDH: Social determinants of health

T2D: Type 2 diabetes

Conflict of Interest statement

No conflict of interest has been declared by the authors.

References

Aschner, P., Galstyan, G., Yavuz, D. G., Litwak, L., Gonzalez-Galvez, G., Goldberg-Eliaschewitz, F., Hafidh, K., Djaballah, K., Tu, S.-T., Unnikrishnan, A. G., & Khunti, K. (2021). Glycemic Control and Prevention of Diabetic Complications in Low- and Middle-Income Countries: An Expert Opinion. *Diabetes Therapy*, *12*(5), 1491–1501. https://doi.org/10.1007/s13300-021-00997-0

Bitton, A., Ratcliffe, H. L., Veillard, J. H., Kress, D. H., Barkley, S., Kimball, M., Secci, F., Wong, E., Basu, L., Taylor, C., Bayona, J., Wang, H., Lagomarsino, G., & Hirschhorn, L. R. (2017). Primary Health Care as a Foundation for Strengthening Health Systems in Low- and Middle-Income Countries. *Journal of General Internal Medicine*, *32*(5), 566–571. https://doi.org/10.1007/s11606-016-3898-5

Cho, N. H., Shaw, J. E., Karuranga, S., Huang, Y., da Rocha Fernandes, J. D., Ohlrogge, A. W., & Malanda, B. (2018). IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes Research and Clinical Practice*, *138*, 271–281. https://doi.org/10.1016/j.diabres.2018.02.023

de Maeseneer, J., Li, D., Palsdottir, B., Mash, B., Aarendonk, D., Stavdal, A., Moosa, S., Decat, P., Kiguli-Malwadde, E., Ooms, G., & Willems, S. (2020). Universal health coverage and primary health care: the 30 by 2030 campaign. *Bulletin of the World Health Organization*, *98*(11), 812–814. https://doi.org/10.2471/BLT.19.245670

De Maeseneer, J., van Weel, C., Daeren, L., Leyns, C., Decat, P., Boeckxstaens, P., Avonts, D., & Willems, S. (2012). From "patient" to "person" to "people": the need for integrated, people centered health care. *International Journal of Person Centered Medicine*, *2*(3), 601–614.

Dendup, T., Feng, X., Clingan, S., & Astell-Burt, T. (2018). Environmental Risk Factors for Developing Type 2 Diabetes Mellitus: A Systematic Review. *International Journal of Environmental Research and Public Health*, *15*(1), 78. https://doi.org/10.3390/ijerph15010078

ECLAC. (2014). *Guaranteeing Indigenous People's Rights in Latin America: Progress in the Past Decade and Remaining Challenges.* https://repositorio.cepal.org/bitstream/handle/11362/37051/4/S1420782_en.pdf

ElSayed, N. A., Aleppo, G., Aroda, V. R., Bannuru, R. R., Brown, F. M., Bruemmer, D., Collins, B. S., Hilliard, M. E., Isaacs, D., Johnson, E. L., Kahan, S., Khunti, K., Leon, J., Lyons, S. K., Perry, M. Lou, Prahalad, P., Pratley, R. E., Seley, J. J., Stanton, R. C., … Gabbay, R. A. (2023). 5. Facilitating Positive Health Behaviors and Well-being to Improve Health Outcomes: *Standards of Care in Diabetes—2023*. *Diabetes Care*, *46*(Supplement_1), S68–S96. https://doi.org/10.2337/dc23-S005

Fernández Juárez, G. (2020). Cultura, enfermedad y maleficio en los pueblos amerindios. Apuntes bolivianos. *Disparidades. Revista de Antropología*, *75*(1), 006. https://doi.org/10.3989/dra.2020.006

Flood, D., Hane, J., Dunn, M., Brown, S. J., Wagenaar, B. H., Rogers, E. A., Heisler, M., Rohloff, P., & Chopra, V. (2020). Health system interventions for adults with type 2 diabetes in low- and middle-income countries: A systematic review and meta-analysis. *PLOS Medicine*, *17*(11), e1003434. https://doi.org/10.1371/journal.pmed.1003434

Grewal, E. K., Campbell, R. B., Booth, G. L., McBrien, K. A., Hwang, S. W., O'Campo, P., & Campbell, D. J. T. (2021). Using concept mapping to prioritize barriers to diabetes care and self-management for those who experience homelessness. *International Journal for Equity in Health*, *20*(1), 158. https://doi.org/10.1186/s12939-021-01494-3

IDF. (2021, December 9). *Diabetes facts & figures.* International Diabetes Federation. https://www.idf.org/aboutdiabetes/what-is-diabetes/facts-figures.html

Kamei, T., Takahashi, K., Omori, J., Arimori, N., Hishinuma, M., Asahara, K., Shimpuku, Y., Ohashi, K., & Tashiro, J. (2017). Toward Advanced Nursing Practice along with People-Centered Care Partnership Model for Sustainable Universal Health Coverage and Universal Access to Health. *Revista Latino-Americana de Enfermagem*, *25*(0). https://doi.org/10.1590/1518-8345.1657.2839

Kane, M., & Trochim, W. (2007). *Concept mapping for planning and evaluation.* (L. Bickman & D. Rog, Eds.; 1st ed., Vol. 50). SAGE publications.

Lateef, Adepeju. M., & Mhlongo, Euphemia. M. (2020). A Literature Review on People-Centered Care and Nursing Practice in Primary Health Care Setting. *Global Journal of Health Science*, *12*(2), 23. https://doi.org/10.5539/gjhs.v12n2p23

Leyns, C., Couvreur, N., Willems, S., & Van Hecke, A. (2021). Needs and resources of people with type 2 diabetes in peri-urban Cochabamba, Bolivia: a people-centred perspective. *International Journal for Equity in Health*, *20*(1). https://doi.org/10.1186/s12939-021-01442-1

Mamani-Ortiz, Y., San Sebastián, M., Armaza, A. X., Luizaga, J. M., Illanes, D. E., Ferrel, M., & Mosquera, P. A. (2019). Prevalence and determinants of cardiovascular disease risk factors using the WHO STEPS approach in Cochabamba, Bolivia. *BMC Public Health*, *19*(1), 786. https://doi.org/10.1186/s12889-019-7064-y

Marmot, M. (2010). *Fair society, healthy lives: Strategic review of health inequalities in England post-2010 The Marmot Review*. https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review

Morris, M., Halcomb, E., Mansourian, Y., & Bernoth, M. (2022). Understanding how general practice nurses support adult lifestyle risk reduction: An integrative review. *Journal of Advanced Nursing*, *78*(11), 3517–3530. https://doi.org/10.1111/jan.15344

Nundy, S., Cooper, L. A., & Mate, K. S. (2022). The Quintuple Aim for Health Care Improvement. *JAMA*, *327*(6), 521. https://doi.org/10.1001/jama.2021.25181

Rodriguez, P., Leyns, C., Azcarruns, C., & Camacho Hinojosa, V. (2021). *Situación actual de la Atención Primaria de Salud del sistema publico in Sacaba (Cochabamba - Bolivia) dentro del contexto del proyecto "Thani Warmi" con la prevención de cancer de cuello uterino.* https://www.cies.org.bo/wp-content/uploads/2022/01/CACU-ARES.pdf

Safaei, M., Sundararajan, E. A., Driss, M., Boulila, W., & Shapi'i, A. (2021). A systematic literature review on obesity: Understanding the causes & consequences of obesity and reviewing various machine learning approaches used to predict obesity. *Computers in Biology and Medicine*, *136*, 104754. https://doi.org/10.1016/j.compbiomed.2021.104754

Urbanoski, K., Pauly, B., Inglis, D., Cameron, F., Haddad, T., Phillips, J., Phillips, P., Rosen, C., Schlotter, G., Hartney, E., & Wallace, B. (2020). Defining culturally safe primary care for people who use substances: a participatory concept mapping study. *BMC Health Services Research*, *20*(1), 1060. https://doi.org/10.1186/s12913-020-05915-x

Verma, S., & Hussain, M. E. (2017). Obesity and diabetes: An update. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, *11*(1), 73–79. https://doi.org/10.1016/j.dsx.2016.06.017

Walker, R. J., Strom Williams, J., & Egede, L. E. (2016). Influence of Race, Ethnicity and Social Determinants of Health on Diabetes Outcomes. *The American Journal of the Medical Sciences*, *351*(4), 366–373. https://doi.org/10.1016/j.amjms.2016.01.008

WHO. (2015). *WHO global strategy on integrated people-centred health services 2016-2026: Placing people and communities at the centre of health services.* https://apps.who.int/iris/bitstream/handle/10665/180984/WHO_HIS_SDS_2015.20_eng.pdf

WHO. (2022, March 18). *Nursing and midwifery: key facts.* World Health Organization. https://www.who.int/news-room/fact-sheets/detail/nursing-and-midwifery

655

Table 1 Summary of needs expressed in 2019 by patients with T2D in Sacaba, Cochabamba, Bolivia (adapted from Leyns, 2021)

Self-management	***Health care providers***	***Health system***	***Community***
Taking plants, herbs, and other natural remedies	Healthcare personnel tries to reduce fear of the condition through talking and explaining the condition (psychological assistance)	Having hospitals close by that accept you when you need urgent medical care	A community council engaged in enhancing health of its' inhabitants
Having a journal to register and follow up foods, symptoms, blood sugar… daily.	A physician that knows the medical and social history of the patient	Having enough physicians and medical material in the region to meet the needs of the population	People with knowledge of good nutrition and foods in the community who give classes on how to eat in a healthy way
Having the possibility to measure the sugar level in your blood periodically	Healthcare personnel teaches the patient about diabetes	Waiting little time in line for medical assistance in healthcare facilities	Having good provision of healthy foods in the neighborhood
Knowing the different types of medication and its' side-effects	Having information and orientation on healthy foods during medical attention	Having access to nutritionist	Having streets without dogs so you can walk and exercise in a safe way
		Community and/ or home-visits of healthcare personnel	
		Having first aid or a physician on duty in the community	

Table 2: Description of study participants.

Function	Professional nurse	Technical nurse	Professional nurse trainee	Technical nurse trainee	Physician	Total
Brainstorming workshops: generating statements						
N° participants	7	12	1	7	1	28
Participated in session	1, 2	1, 2, 3	1	1, 2, 3	2	1, 2, 3
Female/ male	7/0	12/0	1/0	5/2	1/0	26/2
Age ≥ 25	7	10	0	1	1	19
Contract*	1 SAFCI 6 temp.	3 SAFCI 3 items 6 temp.	NA	NA	 1 item	4 SAFCI 4 items 12 temp.
Indigenous**	5	10	1	4	1	21
Questionnaire: rating statements						
N° participants	5	9	3	4		21
Participated in brainstorming	5	7	1	2		15
Female/ male	5/0	9/0	2/1	2/2		18/3
Age ≥ 25	5	8	1	1		15
Contract*	 5 temp.	2 SAFCI 3 items 4 temp.	NA	NA		2 SAFCI 3 items 9 temp.
Indigenous**	3	7	2	2		14

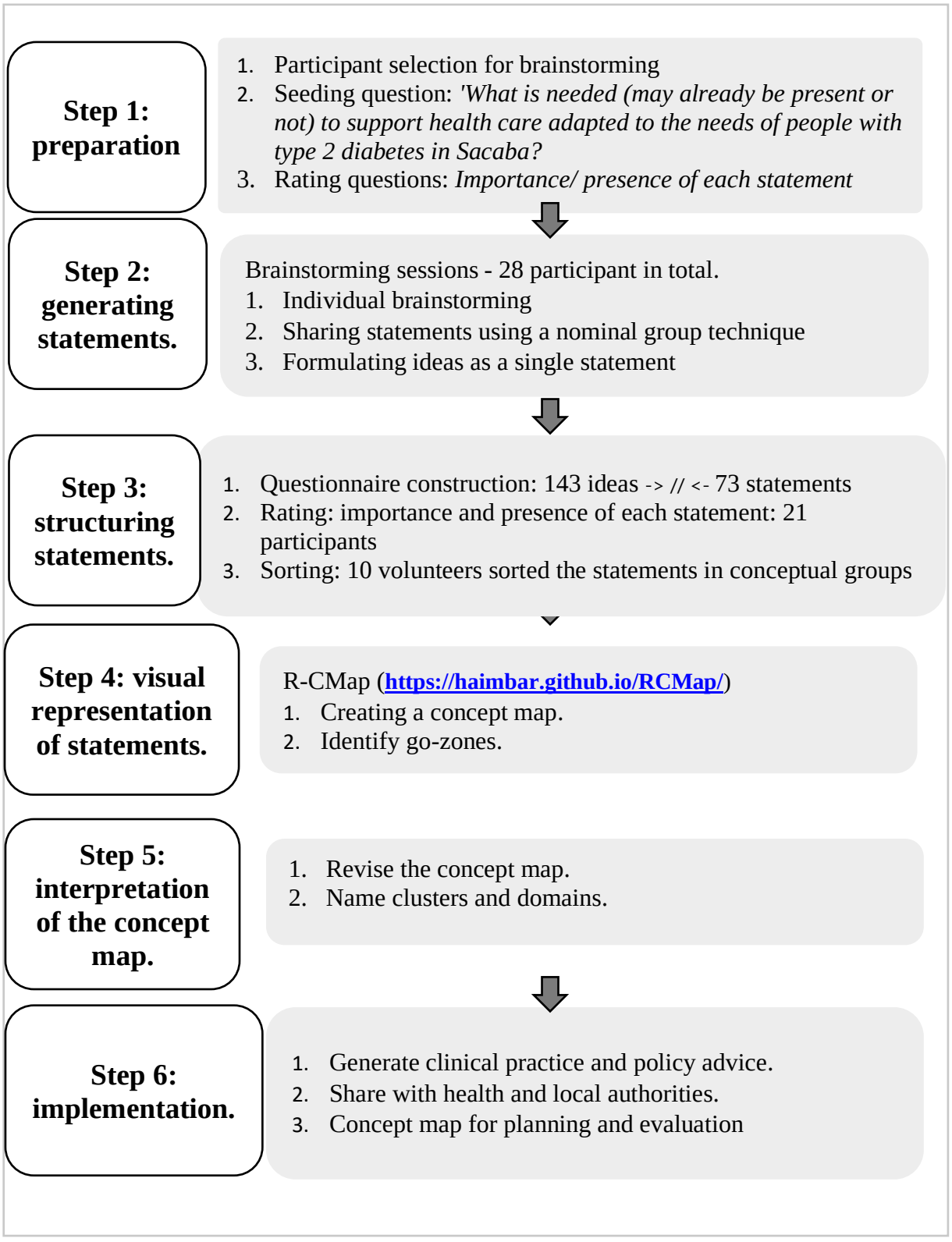
**Contract: SAFCI = Staff Mi Salud-SAFCI, item= fixed contract, temp. = temporal municipal contract.*

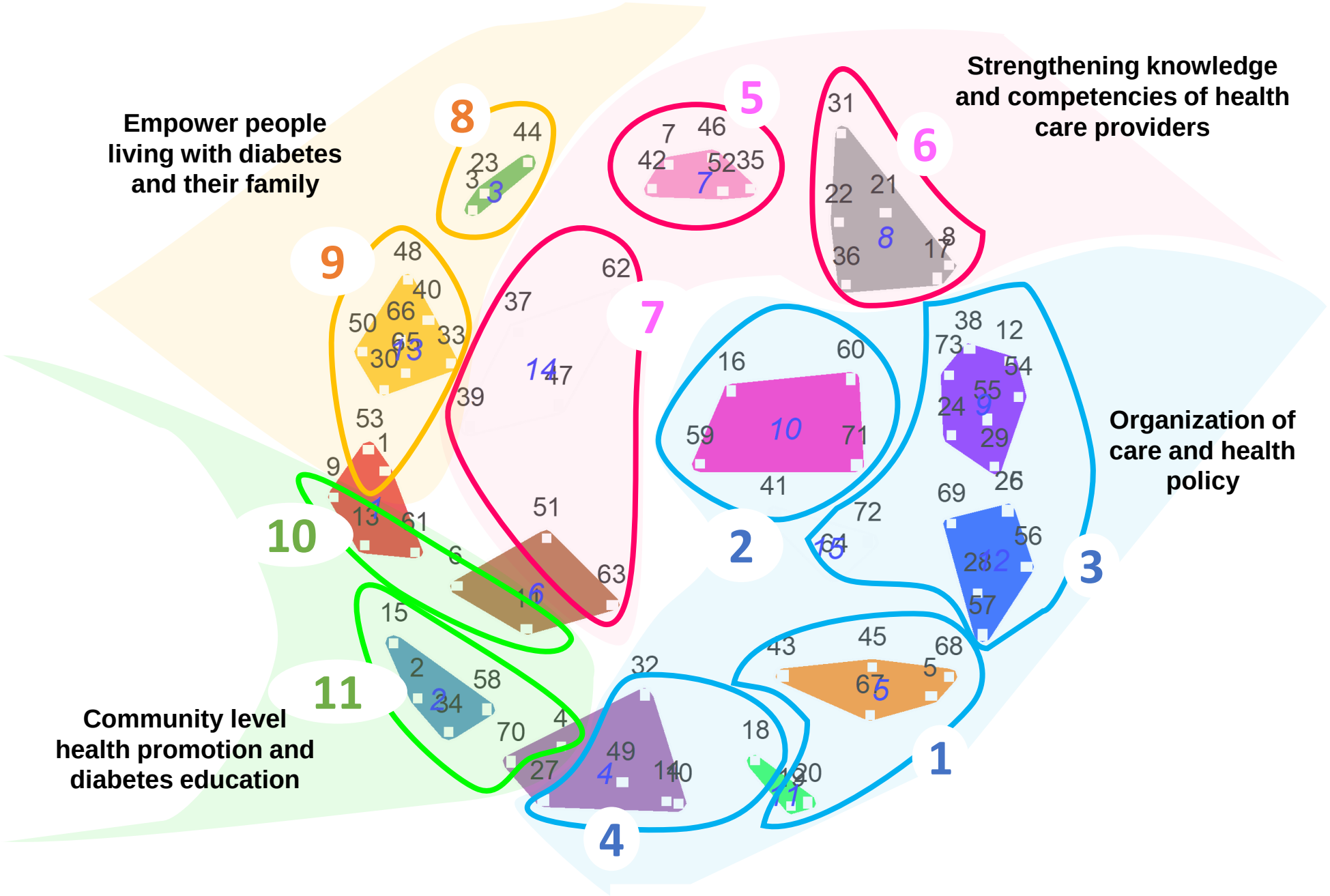
*** Indigenous: nurses that speak an indigenous language as their mother tongue, all participants speak Castellano/Spanish*

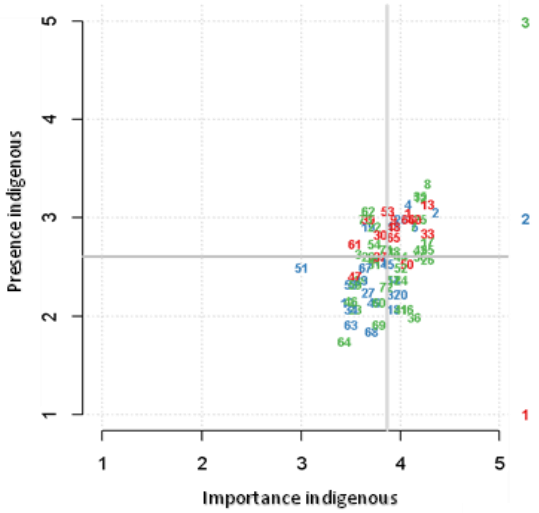
Table 3: Ratings of domains, clusters, and statements to support the life needs of people with T2D from a nurse perspective.

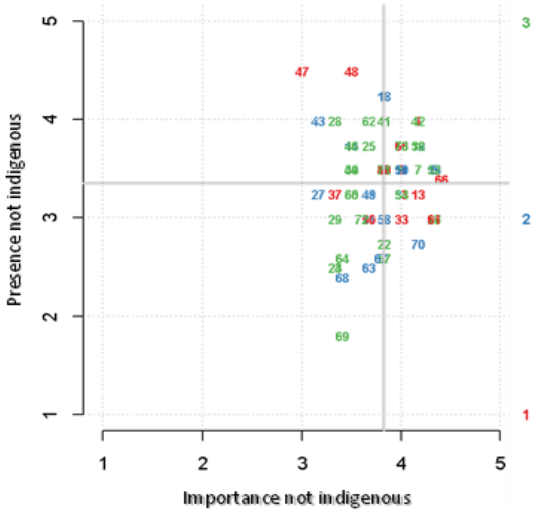
RATINGS:	Importance		Presence	
	$\bar{x}$	σ	$\bar{x}$	σ
ORGANIZATION OF CARE AND HEALTH POLICY (34)	**3.8**	**0.9**	**2.7**	**1.3**
Cluster 1. A primary care-based diabetes program (8)	**3.8**	**0.9**	**2.7**	**1.4**
Create a diabetes program, including protocols, within the health system.	4.2	0,8	3.1	1.5
Create a form or register that can be given to diabetes patients so that they can write down their glucose (and blood pressure) measurement.	3.7	0.8	2.5	1.4
Cluster 2. Facilitate physical access to diabetes care (6)	**3.8**	**0.8**	**2.5**	**1.3**
A nursing consultation room where there is enough time to educate people with chronic diseases (such as diabetes).	4.1	0.8	2.5	1.3
That it is clear where diabetes patients can get their necessary care (that they are not sent from here to there).	3.5	0.8	2.6	1.3
Cluster 3. Adequate working conditions. equipment. and supplies (15)	**3.9**	**0.9**	**2.8**	**1.3**
Periodic monitoring of blood sugar levels.	4.3	0.9	2.8	1.4
Have access to the medical record to facilitate patient's care.	3.8	1.0	3.2	1.3
Cluster 4. Regulations to promote healthy lifestyles (5)	**3.7**	**1.1**	**2.5**	**1.4**
Increasing safety on the street to be able to walk (dogs on a leash. no thieves).	3.9	1.1	2.6	1.3
Support the production of healthy and economically accessible food (such as greenhouses/nurseries and family gardens).	3.5	1.1	2.5	1.3
STRENGTHENING KNOWLEDGE, SKILLS, AND ATTITUDES OF HEALTH CARE PROVIDERS (16)	**3.8**	**1.0**	**2.9**	**1.3**
Cluster 5. Training of nurses and other HHRR on diabetes care and health promotion (6)	**4.0**	**0.9**	**2.8**	**1.3**
Training for nurses on how to provide health education with the possibility of certification or specialization.	4.2	0.8	3.0	1.5
Nurses with knowledge about which medicinal plants can be taken as part of treatment for diabetes.	3.5	1.2	2.6	1.3
Cluster 6. Provide humanized care including mental health (4)	**3.9**	**0.9**	**2.9**	**1.2**
Providing warm, humane care to the patient.	4.2	0.9	3.4	1.4
Home visits to get into people's circle of trust and to be able to offer emotional support.	3.8	0.8	2.8	1.1
Cluster 7. Lifelong cultural appropriate care support (6)	**3.5**	**1.0**	**2.8**	**1.2**
Improving lifelong adherence to therapy of people with diabetes.	3.7	1.0	3.1	1.3
Prevent health workers or other people, diabetics from banning foods, such as potatoes, cereals, or fruits.	3.3	1.3	2.8	1.1
EMPOWER PEOPLE LIVING WITH DIABETES AND THEIR FAMILY (12)	**3.9**	**0.8**	**3.0**	**1.3**
Cluster 8. Peer and family support for people with diabetes (3)	**3.7**	**0.9**	**2.6**	**1.3**
Involve the families of patients with diabetes in training and education.	3.9	0.9	2.8	1.4
Testimonials from people with diabetes complications to raise awareness among other patients.	3.5	1.0	2.2	1.1
Cluster 9. Promote self-management through patient education and motivation (9)	**4.0**	**0.8**	**3.1**	**1.3**
Educate diabetes patients about diabetes and possible complications.	4.2	0.8	2.9	1.2
Motivate patients to self-control their diabetes.	3.8	0.9	3.3	1.3
COMMUNITY LEVEL HEALTH PROMOTION AND DIABETES EDUCATION (11)	**3.9**	**0.9**	**2.8**	**1.3**
Cluster 10. Community education on diabetes prevention (5)	**3.9**	**0.9**	**2.9**	**1.3**
Educational conversations at the OTB's (municipal organizations) about diabetes and the care around it.	3.9	1.0	3.1	1.3
NGOs and/or the state should inform the population about the danger of diabetes.	3.8	1.0	2.7	1.3
Cluster 11. Strategies to improve eating habits in the community (6)	**3.9**	**0.9**	**2.8**	**1.3**
Improve eating habits during pregnancy and early childhood.	4.2	0.8	3.2	1.5
Improve lunches during (educational) workshops.	3.6	1.0	2.5	1.3

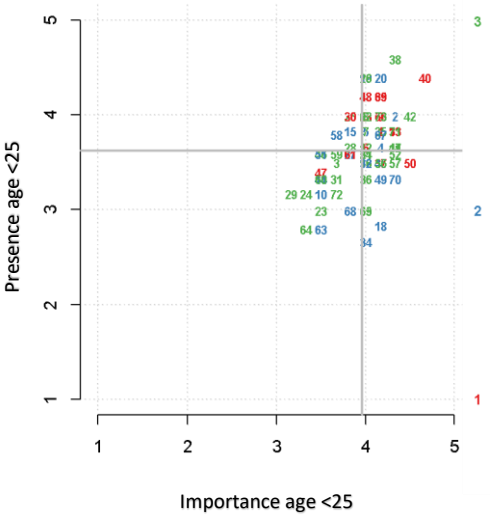
Four domains (upper case) with corresponding clusters (bold); the number between parentheses at the end corresponds with the number of statements in each domain or cluster. $\bar{x}$=mean value based on the rating of all participants; σ=standard deviation of the mean.

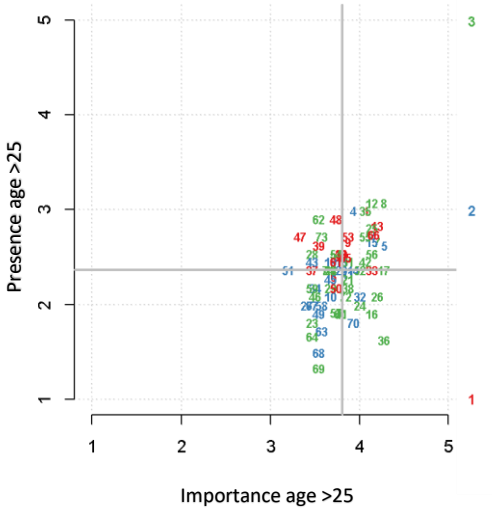

Step 1: preparation
1. Participant selection for brainstorming
2. Seeding question: 'What is needed (may already be present or not) to support health care adapted to the needs of people with type 2 diabetes in Sacaba?
3. Rating questions: Importance/ presence of each statement
Step 2: generating statements.
Brainstorming sessions - 28 participant in total.
1. Individual brainstorming
2. Sharing statements using a nominal group technique
3. Formulating ideas as a single statement
Step 3: structuring statements.
1. Questionnaire construction: 143 ideas -> // <- 73 statements
2. Rating: importance and presence of each statement: 21 participants
3. Sorting: 10 volunteers sorted the statements in conceptual groups
Step 4: visual representation of statements.
R-CMap (https://haimbar.github.io/RCMap/)
1. Creating a concept map.
2. Identify go-zones.
Step 5: interpretation of the concept map.
1. Revise the concept map.
2. Name clusters and domains.
Step 6: implementation.
1. Generate clinical practice and policy advice.
2. Share with health and local authorities.
3. Concept map for planning and evaluation


Empower people living with diabetes and their family
Strengthening knowledge and competencies of health care providers
Organization of care and health policy
Community level health promotion and diabetes education
1
2
3
4
5
6
7
8
9
10
11


Presence indigenous
Importance indigenous


Presence not indigenous
Importance not indigenous


Presence age <25
Importance age <25


Presence age >25
Importance age >25

Statement	CardNo	ClusterNo	ClusterFinal	DOMAIN	Importance_Mean	Importance_SD	Importance_Min	Importance_Max	Presence_Mean	Presence_SD
Organization of care and health policy				**1**	**3.8**	**0.9**	**1**	**5**	**2.7**	**1.3**
1. A PRIMARY CARE BASED DIABETESPROGRAM		**5**	**1**	**1**	**3.8**	**0.9**	**1**	**5**	**2.7**	**1.4**
Create a diabetes program, including protocols, within the health system.	5	5	1	1	4.2	0.8	3	5	3.1	1.5
In addition to health centers, build a sports space (or gym) to give people with diabetes access to sports facilities and encourage them to exercise.	43	5	1	1	3.5	1.2	1	5	2.8	1.5
Adjust the SUS for timely treatment within primary care (rather than having to refer to secondary care before starting treatment).	45	5	1	1	3.8	1.0	2	5	2.7	1.3
Create a form or register that can be given to diabetes patients so that they can write down their glucose (and blood pressure) measurement.	67	5	1	1	3.7	0.7	3	5	2.5	1.4
Implement a phone line for questions about diabetes.	68	5	1	1	3.6	1.0	2	5	2.0	1.3
Screening for diabetes in the population.	19	11	1	1	3.8	0.8	2	5	3.1	1.3
Proactive monitoring (follow-up) of people at high risk (e.g. overweight, family members of diabetics).	20	11	1	1	3.9	0.9	2	5	3.0	1.3
A nutritionist who deals with obesity and diabetics.	**32**	**4**	**1**	**1**	**4.0**	**0.8**	**3**	**5**	**2.6**	**1.5**
2. FACILITATE PHYSICAL ACCESS TO DIABETES CARE		**10**	**2**	**1**	**3.8**	**0.8**	**2**	**5**	**2.5**	**1.3**
A nursing consultation room where there is enough time to educate people with chronic diseases (such as diabetes).	16	10	2	1	4.1	0.8	3	5	2.5	1.5
That it is clear where diabetes patients can get their necessary care (that they are not sent from here to there).	59	10	2	1	3.5	0.7	3	5	2.6	1.3
Implementation of a monitoring map to gain insight into the location of, and facilitate care for, patients with diabetes or risk of diabetes.	60	10	2	1	3.7	0.7	3	5	2.4	1.2
That all employees of the health center work within the community (outreaching care = outside the health centers) (not only those of the SAFCI program).	71	10	2	1	3.9	0.8	3	5	2.9	0.9
A specific space for people with diabetes, where people can obtain information about all aspects of diabetes, get a check-up and pick up their medication.	41	15	2	1	4.0	0.9	3	5	2.5	1.6
Having a space for diabetic emergencies in health centers.	**69**	**12**	**2**	**1**	**3.7**	**0.9**	**2**	**5**	**1.9**	**1.1**
3. ADEQUATE WORKING CONDITIONS, EQUIPMENT AND SUPPLIES		**9**	**3**	**1**	**3.9**	**0.9**	**1**	**5**	**2.8**	**1.3**
Periodic monitoring of blood sugar levels.	**17**	**8**	**3**	**1**	**4.3**	**0.8**	**3**	**5**	**2.8**	**1.4**
Access to timely diagnosis (e.g. direct and free permanent access to a blood glucose test).	12	9	3	1	4.1	0.8	3	5	3.3	1.3
Sufficient health personnel to be able to offer people the necessary time.	24	9	3	1	3.8	1.1	1	5	2.4	1.3
Reduce the workload: the number of patients that the health staff have to take care of per day.	29	9	3	1	3.5	1.2	2	5	2.5	1.3

Every health centre has a functioning glucose meter that nurses can always use.	38	9	3	1	4.0	0.8	3	5	2.9	1.6
Weekly home visits to people with diabetes to improve their access to care and blood glucose checks.	54	9	3	1	3.8	0.9	2	5	2.9	1.3
Incentives for healthcare staff to do a good job.	55	9	3	1	4.0	0.9	3	5	2.8	1.1
Have access to the medical record to be able to help the patient in a better way.	73	9	3	1	3.8	1.0	1	5	3.2	1.3
Continuity in the provision of medicines.	25	12	3	1	4.0	0.9	3	5	3.2	1.0
That the drugs (including insulin) are of high quality and available within the SUS (Public Universal Health Insurance).	26	12	3	1	4.1	0.9	3	5	2.8	1.4
Simplify, digitize and systematize (e.g. automate) the administrative work of nurses.	28	12	3	1	3.6	1.0	1	5	2.9	1.3
Equipping neighbourhood consultation rooms to improve care.	56	12	3	1	4.1	0.8	3	5	2.9	1.3
Access to insulin in first (or second) line care (so that people do not have to go to Viedma (third-line hospital of Cochabamba) for insulin).	57	12	3	1	3.9	0.9	2	5	2.4	1.5
Availability of psychologists for diabetic patients.	64	15	3	1	3.4	1.2	1	5	2.0	1.1
Have specialized and dedicated staff available to make home visits to patients with chronic diseases (such as diabetes).	72	15	3	1	3.8	0.7	3	5	2.5	1.3
4. REGULATIONS TO PROMOTE HEALTHY LIFESTYLES		**4**	**4**	**1**	**3.7**	**1.1**	**2**	**5**	**2.5**	**1.4**
Avoid/regulate advertising for junk food (coca cola, fried foods) during the day to prevent children from looking at it.	10	4	4	1	3.6	1.1	2	5	2.5	1.6
Standardize the sale of junk food in schools and promote nutritious foods (such as fruits, nuts and grains).	14	4	4	1	3.8	1.1	2	5	2.7	1.4
Support the production of healthy and economically accessible food (such as greenhouses/nurseries and family gardens).	27	4	4	1	3.5	1.1	2	5	2.5	1.3
Economic access to healthy food (e.g.: that municipalities provide healthy food to patients with diabetes once a month).	49	4	4	1	3.7	0.9	3	5	2.4	1.3
Increasing safety on the street to be able to walk (dogs on a leash, no thieves).	18	11	4	1	3.9	1.1	2	5	2.6	1.3
Strengthen knowledge and competencies of health care providers				**2**	**3.8**	**1.0**	**1**	**5**	**2.8**	**1.3**
5. CONTINUOUS TRAINING OF NURSES AND OTHER HHRR ON DIABETES CARE AND HEALTH PROMOTION		**7**	**5**	**2**	**4.0**	**0.9**	**1**	**5**	**2.8**	**1.3**
Continuous training for nurses and health personnel about diabetes.	7	7	5	2	4.1	0.9	2	5	3.1	1.2
Nurses must have knowledge about the (side) effect of medications used in diabetes.	35	7	5	2	4.1	0.8	3	5	3.3	1.1
Training for nurses on how to provide health education with the possibility of certification or specialization.	42	7	5	2	4.2	0.8	3	5	3.0	1.5
Nurses with knowledge about which medicinal plants can be taken as part of treatment for diabetes.	46	7	5	2	3.5	1.2	1	5	2.6	1.3

Health personnel who know how to guide patients in what they should eat (nutrition).	52	7	5	2	4.1	0.8	3	5	2.8	1.4
Exclusive staff trained to care for patients with diabetes.	**36**	**8**	**5**	**2**	**4.2**	**0.8**	**3**	**5**	**2.2**	**1.3**
6. PROVIDE HUMANIZED CARE INCLUDING MENTAL HEALTH		**8**	**6**	**2**	**3.9**	**0.9**	**2**	**5**	**2.9**	**1.2**
Providing warm, humane care to the patient.	8	8	6	2	4.2	0.9	2	5	3.4	1.4
Psychological support from the health staff to people with diabetes.	21	8	6	2	3.9	1.0	2	5	2.7	1.2
Invest time and empathy when someone is diagnosed with diabetes so that the patient can accept the disease.	22	8	6	2	3.8	0.8	3	5	2.9	1.2
Home visits to get into people's circle of trust and to be able to offer emotional support.	31	8	6	2	3.8	0.8	3	5	2.8	1.1
7. LIFELONG REALISTIC AND CULTURAL APROPRIATE CARE SUPPORT		**14**	**7**	**2**	**3.5**	**1.0**	**1**	**5**	**2.8**	**1.2**
Prevent health workers or other people, diabetics from banning foods, such as potatoes, grains or fruits.	51	6	7	2	3.3	1.3	1	5	2.8	1.1
Conduct scientific research to find out which medicinal plants (or other forms of traditional medicine) work in the treatment of diabetes and which do not.	63	6	7	2	3.6	0.8	2	5	2.1	1.1
Continuous access for people with diabetes to basic information on how to deal with their disease.	37	14	7	2	3.7	1.0	2	5	2.8	1.1
Improving lifelong adherence to therapy of people with diabetes.	39	14	7	2	3.7	1.0	2	5	3.1	1.3
Patients may take medicinal plants or natural remedies (e.g.: coca, boldo leaves or llama meat) as part of their treatment.	47	14	7	2	3.4	1.3	1	5	2.9	1.5
Health personnel must inform patients in an accurate and comprehensible manner about the studies carried out or laboratory results and explain that they must have laboratory tests carried out for follow-up.	62	14	7	2	3.7	0.9	2	5	3.3	1.1
Empower people living with diabetes and their family				**3**	**3.9**	**0.8**	**1**	**5**	**2.9**	**1.3**
8. PEER AND FAMILY SUPPORT FOR PEOPLE WITH DIABETES		**3**	**8**	**3**	**3.7**	**0.9**	**1**	**5**	**2.6**	**1.3**
Self-help groups for people with diabetes, where they can share experiences.	3	3	8	3	3.7	1.0	2	5	2.8	1.5
Testimonials from people with diabetes complications to raise awareness among other patients.	23	3	8	3	3.5	1.0	1	5	2.2	1.0
Involve the families of patients with diabetes in training and education.	44	3	8	3	3.9	0.9	3	5	2.8	1.4
9. PROMOTE SELF-MANAGEMENT THROUGH PATIENT EDUCATION AND MOTIVATION		**13**	**9**	**3**	**4.0**	**0.8**	**2**	**5**	**3.1**	**1.3**
Provide information about healthy nutrition to people with DMII.	**1**	**1**	**9**	**3**	**4.1**	**0.8**	**3**	**5**	**3.3**	**1.4**
A program or workshops on healthy nutrition for people with diabetes (with incentives to attract participants).	**53**	**1**	**9**	**3**	**3.9**	**0.8**	**3**	**5**	**3.1**	**1.3**
Provide patients with more knowledge about medicinal plants (e.g. organising workshops so that patients can use them safely).	30	13	9	3	3.8	0.8	3	5	3.0	1.3
Educate diabetes patients about diabetes and possible complications.	33	13	9	3	4.2	0.7	3	5	2.9	1.2
Explain to patients about medications (and the side effects).	40	13	9	3	4.1	0.8	3	5	3.1	1.2
Motivate patients to self-control their diabetes.	48	13	9	3	3.8	0.9	2	5	3.3	1.3

Motivate lifestyle change in diabetic patients.	50	13	9	3	4.0	0.8	3	5	2.6	1.4
Give diabetes patients training on normal glucose levels.	65	13	9	3	3.9	0.8	3	5	3.1	1.3
Inform patients about the types of diabetes (type I and type II) so that they can differentiate them.	66	13	9	3	4.2	0.8	3	5	3.1	1.1
Community level health promotion and diabetes education				**4**	**3.9**	**0.9**	**2**	**5**	**2.8**	**1.3**
10. COMMUNITY EDUCATION ON DIABETES PREVENTION		**1**	**10**	**4**	**3.9**	**0.9**	**2**	**5**	**2.9**	**1.3**
Educational conversations at the OTB's (municipal organizations) about diabetes and the care around it.	9	1	10	4	4.0	1.0	2	5	3.1	1.3
Organizing fairs, campaigns or lectures (by hospitals, health centers and care posts) to promote health and prevent diabetes.	13	1	10	4	4.2	0.8	3	5	3.2	1.2
Inform the population about signs and symptoms of diabetes for early recognition of diabetes.	61	1	10	4	3.8	0.8	3	5	2.8	1.0
Using the media to create awareness about diabetes (prevalence, importance...).	6	6	10	4	3.8	0.9	2	5	2.8	1.5
NGOs and/or the state should inform the population about the danger of diabetes.	11	6	10	4	3.8	1.0	2	5	2.7	1.3
11. STRATEGIES TO IMPROVE EATING HABITS IN THE COMMUNITY		**2**	**11**	**4**	**3.9**	**0.9**	**2**	**5**	**2.8**	**1.3**
Eating habits during pregnancy and early childhood improve.	2	2	11	4	4.2	0.8	3	5	3.2	1.5
Working with schools on health promotion and diabetes prevention.	15	2	11	4	4.0	0.8	3	5	3.1	1.3
Investigate how the dietary habits of Cochalos (from Cochabamba) can be regulated.	34	2	11	4	3.7	0.9	2	5	2.4	1.1
Improve lunches during (educational) workshops.	58	2	11	4	3.6	1.0	2	5	2.5	1.3
Coordination with the team of nutrition and dietetics.	**4**	**4**	11	**4**	**4.0**	**1.0**	**2**	**5**	**3.2**	**1.3**
Implement the use of complementary foods for diabetics (e.g.: CN diabetic milk).	**70**	**4**	11	**4**	**4.1**	**0.8**	**3**	**5**	**2.4**	**1.4**