

Digital health for Barangay Health Workers: a mixed-methods baseline assessment in Quezon, Philippines

Priyam Joshi

priyamsjoshi@gmail.com

Georgia State University

Shegufta Shefa Sikder

CARE USA

Feven Tassaw Mekuria

CARE USA

Aimee Mateo

CARE Philippines

Maria Teresa Bayombong

CARE Philippines

Research Article

Keywords: Digital health, Community health workers, Health systems strengthening, Digital readiness, Philippines

Posted Date: September 9th, 2025

DOI: <https://doi.org/10.21203/rs.3.rs-7216218/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background: In the Philippines, Barangay Health Workers (BHWs) are a vital link to primary care in rural communities but face significant challenges. Digital technologies present a scalable opportunity to support and professionalize this workforce, but only if aligned with local contexts. CARE is developing the Healthy, Empowered, Accredited, Linked (HEAL) Hub, a digital platform for BHWs. A mixed-methods baseline and needs assessment was conducted in four municipalities in disaster-prone Quezon to inform HEAL Hub's design and rollout, and to establish a baseline for future evaluation.

Results: The assessment, conducted between February and April 2024, included surveys with 55 BHWs and 120 community members, along with focus groups (BHW n = 13; community member n = 8) and key informant interviews (n = 8). BHWs are highly utilized (90.8% of community members sought services in six months) and trusted (79.0%). Key unmet community health needs included lack of mental health counselling (42.5%) and mobile-based communication (39.2%). BHWs were predominantly female (96.4%) and had over 10 years' service (41.8%). The majority (87.3%) found existing support inadequate, citing low monthly honoraria, irregular training, and politicized appointments. Digital access was high (94.4% phone ownership), but proficiency was limited to basic tasks (>89% for calls/texts) and much lower for complex functions (<39% completing online forms). All BHWs desired digital training; most rated proposed tools, especially a BHW registry, disease surveillance, and structured referrals, as "extremely useful".

Conclusion: BHWs in Quezon are trusted and receptive to digital transformation. However, their effectiveness is constrained by systemic gaps in compensation, training, and governance. For sustainable impact, digital health platforms like HEAL Hub must be designed in partnership with frontline workers and thoughtfully integrated with their workflows and capacities. As key informants suggested: success also requires pairing implementation with structural reforms for compensation and accreditation. This study provides the first context-specific assessment of BHW digital readiness and service capacity in Quezon Province. This paper offers practical insights to guide digital health investments in similar underserved settings, inform targeted capacity-building, and support the professionalization of community health workers within broader efforts to strengthen primary care systems.

Background

Health inequities within and across countries remain a persistent global challenge. Over half of the world's population still lacks access to essential health services [1] and more than one billion people face catastrophic out-of-pocket health expenditures [2]. These disparities are especially severe in low-resource settings, where chronic underinvestment has led to critical shortages of healthcare workers and infrastructure. The World Health Organization (WHO) projects a global shortfall of 10 million health workers by 2030, with the burden falling most heavily on low- and middle-income countries (LMICs) [3].

Community health workers (CHWs) have emerged as key actors in bridging these gaps. They provide culturally appropriate promotive, preventive, and basic curative services, often serving as the first (and sometimes only) point of care in underserved communities [4]. Their role is central to achieving the goals of primary health care outlined in the 1978 Declaration of Alma-Ata, which emphasized universal access, equity, and community participation. A robust evidence base confirms that CHWs are highly impactful and cost-efficient, improving a wide range of outcomes in immunization, chronic disease management, and maternal and child survival compared to standard care [5, 6]. Their effectiveness is further enhanced when supported by structured training, ongoing supervision, and formal integration into national health systems [7].

The Philippines offers a salient example of both the promise and challenges of community-based health care [8]. Despite sustained economic growth, significant health disparities persist across its regions currently [9, 10]. The country launched its Barangay Health Worker (BHW) program in the 1980s and institutionalized it under the 1991 Local Government Code [8, 11]. Approximately 253,000 BHWs now provide front-line care, health education, and referral services across 42,011 *barangays* (the smallest administrative division in the Philippines) [12]. Yet, BHWs remain an under-recognized and under-supported part of the health system. BHWs are legally classified as “volunteers” under Republic Act (RA) No. 7883 [13], which delegates decisions on their compensation, security, and benefits to often resource-strapped Local Government Units (LGUs), creating major gaps in protection, compensation, and career development [8, 14, 15].

This “volunteer” status masks systemic issues. Globally, CHWs are predominantly female [16] and in the Philippines, women constitute 95% of the BHW workforce [12]. Scholars argue this demographic imbalance allows CHW roles to be framed as an extension of women’s domestic caregiving, justifying chronic underinvestment [17]. Consequently, BHWs receive stagnant honorariums (often US\$10–\$17 monthly) and frequently cover patient expenses themselves, effectively externalizing healthcare costs onto workers [17-20]. Ultimately, the role becomes a precarious public service, offering no career advancement and imposing significant “financial, physical, and psychological costs of caring” on the women who perform it [8, 21-23].

Governance failures and fragmented systems further compound these issues. Under RA 7883, appointments are typically controlled by *barangay* captains and shaped by political patronage rather than standardized criteria. This vulnerability is especially acute for the female-dominated BHW workforce, whose power to advocate for professional protections may be undermined by the underrepresentation of women in local governance. As of 2022, only 24% of elected positions in Philippines were held by women [24]. Political turnover can lead to mass dismissals, as evidenced by reports of 80,000 BHWs removed following the October 2023 *barangay* elections [25]. Such disruptions impact care continuity and waste scarce training resources [8, 22].

Training is similarly fragmented. Despite Department of Health (DoH) guidelines calling for regular updates, initial orientation is brief and refresher courses depend on local budgets [22]. Although policies

like the BHW Benefits and Incentives Act (RA 7883) and the Magna Carta of Public Health Workers (RA 7305) aim to improve worker welfare, enforcement remains highly uneven [22]. The Senate passed the Magna Carta of BHWs (SB 2838) in 2025, mandating a monthly honorarium of ₱3,000 (approximately \$52-53) and expanded benefits. This is a major step forward, though its success will inevitably hinge on effective implementation, accountability, and funding [26].

Digital health is defined by the WHO as “the field of knowledge and practice associated with the development and use of digital technologies to improve health” and offers a powerful method for professionalizing the frontline workforce and strengthening health systems [27]. Evidence from numerous LMICs confirms that mobile health (mHealth) tools can enhance training, disease surveillance, and decision support while improving data quality and service coverage. For example, Dimagi's CommCare platform, one of the most rigorously evaluated digital tools for CHWs [28], led to a 73% increase in antenatal care visits in Bihar, India [29] and an 11 percentage-point rise in institutional deliveries in rural Tanzania [30]

However, as digital infrastructure expands across the Global South, the primary barrier to scale is shifting from technological access to human-centered challenges: digital literacy, user capability, and context-specific integration [31-35]. A survey of 1,141 CHWs across 28 countries (including 308 in the Philippines) found formal training to be the strongest predictor of both use of digital tools (AOR 2.92) and belief in digital impact (AOR 3.03), whereas perceived costs, for example, of mobile services (AOR 0.68) and devices (AOR 0.66), significantly reduced uptake [34]. Notably, infrastructural barriers such as limited internet connectivity did not deter device use, likely reflecting the prevalence of offline-capable platforms. Demographic factors traditionally thought to hinder adoption (e.g. older age and longer tenure) were in fact associated with greater device use and stronger belief in impact, indicating that experienced CHWs are both capable and enthusiastic adopters of digital health when adequately supported through training and mitigated cost [34]. Systematic reviews confirm that just a few hours to one week of targeted instruction yields mastery of core mhealth functional skills, high acceptability, stronger decision-support, and up to 24% better protocol adherence [36]. Consequently, WHO's Digital Health Interventions guidelines [27] and related toolkits [37] now call for competency-based, tiered digital literacy programs embedded in broader health strategies. For technologies to deliver on this promise long-term, they must be co-designed with end-users, align with existing workflows, and be integrated into accountability systems, otherwise risking frustration [38] and added workload [32, 39, 40].

The Philippines has aimed to harness the potential of digital health, with the DoH launching the eHealth Strategic Framework and Plan in 2014 [41] and the Universal Health Care Act, which commits every facility to have interoperable electronic medical records by 2028. However, implementation is still uneven as only 6 percent of Philippine health facilities had internet connectivity as of 2024 [42, 43]. Even where connectivity exists, frontline capability can be a barrier; a 2025 mixed-methods study in Tibiao, Antique found that just 32.2 percent of surveyed BHWs met basic computer-literacy standards, despite moderate access to mobile devices and internet coverage. Those who did meet standards achieved 46% faster

reporting and 59% more accurate data collection, in addition to better engagement with digital health programs and higher overall supervisor performance ratings. Many of the BHWs cited lack of training, financial barriers, and unfamiliarity with English-language interfaces as key obstacles to effective digital engagement [44]. Successful digital transformation in the Philippines thus hinges on holistic “digital readiness”, or the alignment of infrastructure, skills, local workflows, and community acceptance.

Quezon Province, a largely rural and disaster-prone province in Calabarzon region, is a critical setting where these systemic and digital challenges converge. It is home to over 2.2 million residents (as of the 2020 census) across 1,209 *barangays*, many of which face seasonal inaccessibility due to typhoons and flooding [45]. According to data provided by the Integrated Provincial Health Office of Quezon Province, there are only 8,300 BHWs providing healthcare services in the area, 1,700 of which are inadequately trained. Although national policy mandates province-wide telemedicine services (DOH-DILG-PhilHealth Joint Administrative Order No. 2021-0001) [46], there is no public evidence of meaningful implementation in Quezon. Additionally, no peer-reviewed studies to date have assessed digital health readiness in Quezon. In contrast to urban-focused pilot programs, Quezon remains effectively unstudied in the literature. This absence of implementation data or provincial evaluation highlights a broader pattern: national ambitions for digital transformation have yet to reach, or be meaningfully assessed in, structurally disadvantaged rural provinces like Quezon.

Methods

Healthy, Empowered, Accredited, Linked Hub (HEAL Hub)

CARE Philippines and the Southern Tagalog People’s Response Center (STPRC) launched the Healthy, Empowered, Accredited, Linked (HEAL) Hub in February 2024. This initiative is part of CARE’s global She Heals the World portfolio, which aims to train, protect, and professionalize 2.5 million frontline and community health workers by 2030. The HEAL Hub is being developed on Dimagi’s CommCare platform to integrate case-management and referral tools, self-paced continuing and patient education modules (maternal and child health, infectious diseases, health promotion, etc.), and a regionally anchored peer-support network into a single, offline-capable mobile application. Each module will award a digital badge on completion and users who finish the full curriculum will receive a certificate endorsed by the Philippine Department of Health. Data logged offline is encrypted and queued for automatic synchronization when connectivity is restored, preserving service continuity and enabling near real-time monitoring of training uptake, engagement, and learning outcomes. Co-designed with DOH technical teams to align with national protocols and future District Health Information Software 2 (DHIS2) deployments, the pilot phase targets 1,500 BHWs across four rural Quezon municipalities: San Narciso, Macalelon, General Luna, and Catanauan. These sites represent a wide cross-section of rural Quezon, with high health needs and limited access to in-person training.

Rationale and objectives

To ensure that HEAL Hub is responsive and sustainable, it is necessary to understand the existing conditions that shape BHWs' ability to engage with digital platforms. Without a thorough understanding of baseline conditions, HEAL Hub and other digital interventions may fail to meet the real-world needs of the workers they aim to support. To investigate these existing conditions, a mixed-methods baseline and needs assessment was conducted across the target municipalities. The study involved community members, BHWs and health officials, integrating their perspectives to help understand the ecosystem in which HEAL Hub will operate. The objectives of this assessment were to:

1. Map the scope, quality, and utilization of services currently delivered by BHWs, and document community trust and satisfaction.
2. Assess BHWs' workload, work characteristics, challenges, training gaps, needs, digital literacy, and the material and supervisory support they receive.
3. Establish baseline indicators for key metrics (e.g., service coverage, client satisfaction, community trust) to enable meaningful before-and-after comparisons.
4. Examine the use of digital tools and the broader governance, financing, and connectivity environment that could facilitate or hinder HEAL Hub adoption.

The Philippines lacks detailed, province-level data on the digital readiness and operational capacity of BHWs. As the country advances its digital health agenda, this gap is particularly critical in rural and geographically isolated and disadvantaged areas, where digital innovations have the potential to drive meaningful improvements in service delivery. This study offers the first comprehensive, context-specific needs assessment of BHW digital readiness and service capacity in Quezon Province. Additionally, the study integrates input from multiple stakeholders through surveys, focus group discussions (FGDs), and interviews to broaden our understanding of relevant health barriers. By utilizing a needs-responsive and strengths-based approach to assessing frontline digital capacity, the study also considers broader systems-level factors such as policy context and institutional support. Although developed for Quezon, this approach can be adaptable to other underserved settings, offering practical insights to guide digital health investments, inform targeted capacity-building, and support the professionalization of community health workers within broader efforts to strengthen primary care systems.

Study design and setting

We utilized a cross-sectional mixed-methods design. The study was conducted from February to April 2024 across four rural municipalities in Quezon Province (Macalelon, General Luna, Catanauan, and San Narciso). These sites were purposively selected as they typify the province-wide shortage of adequately trained BHWs and have supportive local health authorities willing to pilot digital interventions.

Participants and sampling

The study involved three groups: (1) BHWs (2) adult community members receiving BHW services, and (3) municipal health officials and local professionals supporting BHWs. Due to security constraints and lack of sampling frames, purposive sampling was used. Minimum sample sizes were calculated using the Feed the Future tool¹: 49 to detect a digital literacy increase (70% to 90%) and 120 for a satisfaction increase (65% to 80%), both at 95% confidence and 80% power, with a 9% non-response adjustment. The final survey sample included 175 survey participants: 55 BHWs and 120 community members. Qualitative data were collected through FGDs with BHWs (n = 13) and community members (n = 8), and eight key informant interviews (KIIs) with local health professionals (n = 4) and municipal officials (n = 4). Table 1 summarizes the participant groups.

Table 1 Participants and data-collection methods

Participant group	Method	n
Barangay Health Workers	Survey	55
	FGD	13
Community members	Survey	120
	FGD	8
Health professionals*	KII	4
Health officers†	KII	4

** Midwives and public health nurses.*

† Municipal medical officers/BHW coordinators.

Data collection procedures

Quantitative data were collected in person using KoboCollect² [47], allowing offline entry and secure encrypted upload. FGDs and KIIs were conducted in Tagalog using semi-structured guides developed by CARE Philippines and STPRC. Sessions (30–90 minutes) were audio-recorded with consent, facilitated by trained local staff, and supplemented by detailed field notes.

Measures

Quantitative measures

Quantitative instruments included structured questionnaires administered in person via KoboCollect. The BHW survey was a comprehensive instrument designed to assess demographic and professional

background, service delivery patterns, digital readiness, and training needs. It collected data on BHWs' age, sex, education, years of service, and workload, including the number of household visits and patient referrals made in the last three months. Self-reported confidence in performing eight core service domains (e.g., maternal health, patient referral) was measured on a 5-point Likert scale (1 = No confidence to 5 = High confidence). The survey also documented the types of support (e.g., honorarium, materials) and certification received. Digital readiness was evaluated by assessing mobile device ownership, self-reported familiarity and confidence (Yes/No) with digital tasks like using the internet and online forms, and proficiency with specific mobile phone functions. Finally, BHWs rated the perceived usefulness of nine potential mobile app features on a 5-point scale (1 = Not useful to 5 = Extremely useful) and indicated their interest (Yes/No) in over 20 specific health training topics.

The community member survey captured demographic data, service utilization, and perceptions of BHWs. The instrument documented respondents' age, sex, education, and length of residence. It measured the frequency and type of BHW services received in the last six months. Satisfaction with overall and specific services was rated on a 5-point Likert scale (1 = Very dissatisfied to 5 = Very satisfied), while BHWs' skills in six areas (e.g., communication, helpfulness) were rated on a 5-point scale (1 = Very poor to 5 = Very good). Both personal trust and perceived community trust in BHWs were assessed on a 5-point scale (1 = Do not trust at all to 5 = Completely trust). Unmet health needs were identified using a checklist of services not currently provided by BHWs.

Qualitative Measures

Qualitative data were collected through semi-structured focus group discussions and key informant interviews. The complete guides, developed for this study by CARE Philippines and STPRC, are provided as supplementary files: the Focus Group Discussion Guide with Barangay Health Workers (Additional file 1), the Focus Group Discussion Guide with Community Members (Additional file 2), and the Key Informant Interview Guide (Additional file 3).

BHW focus group discussions. The discussion guide for BHWs explored their day-to-day routines, caseloads, and the most common health issues they manage. It prompted discussion on their confidence in providing quality services, barriers to effective care, and the types of support they receive from the LGU (see Additional file 1).

Community member focus group discussions. The discussion guide for community members focused on their experiences with BHW services, including the types of services received and satisfaction with their delivery. It aimed to identify the most important services provided by BHWs, service gaps, and community perceptions of trust. Participants were also asked how BHWs could be better supported to improve care quality (see Additional file 2).

Key informant interviews. The interview guide for health professionals and municipal health officers explored systemic factors influencing BHW performance. Key topics included the processes for BHW recruitment, training, and certification; the types of support provided by the LGU; high-demand and unmet health services in the community; and professional and community perceptions of BHWs'

trustworthiness and competence. The interviews also sought recommendations for strengthening BHW capacity and service delivery (see Additional file 3).

Data analysis

Quantitative data were exported from KoBoCollect and analyzed in Microsoft Excel. Descriptive statistics (frequencies, percentages, means, standard deviations, and ranges) were calculated as appropriate. Continuous variables were retained unless otherwise noted. Qualitative data were transcribed verbatim, translated into English when needed, and analyzed thematically using an iterative approach. Transcripts were managed in Microsoft Word and Excel. Two researchers independently reviewed the transcripts, developed a codebook combining deductive codes (from study objectives and guides) and inductive codes (emerging from the data), and identified key themes and sub-themes. Discrepancies in coding were resolved through discussion to reach consensus, and saturation was considered achieved when subsequent interviews yielded no new emergent themes related to the study objectives. Quantitative and qualitative findings were integrated during analysis through triangulation to provide a comprehensive understanding of BHW capabilities, community needs, and priorities relevant to the HEAL Hub intervention.

Ethical considerations

Enumerators from CARE's local partner organizations received orientation on the organization's Safeguarding Policy to ensure participant protection. Written informed consent was obtained from all participants, with clear explanation of the study's purpose, procedures, potential risks, and confidentiality measures. Personal identifiers were stored separately to maintain anonymity. Participant incentives were aligned with local norms. Trial registration was not applicable as this was not a clinical trial.

Results

Results are presented by participant group: (1) survey and focus-group findings for community members, (2) survey and focus-group findings for BHWs, and (3) insights from key-informant interviews.

Community members

Socio-demographic profile of community survey participants

Of the 120 community members surveyed, 83.3% (n = 100) were female. The average household size was 4.5 (SD = 2.0; range: 1–12). A third of respondents were aged 41–59 years (31.7%, n = 38), and 88.3% (n = 106) had lived in the *barangay* for over 10 years. Most participants were married (67.5%, n =

81) and had completed secondary education (53.3%, n = 64). Additional details are in Table 2. Eight participants also joined the focus group discussion, which achieved thematic saturation.

Table 2 Sociodemographic profile of community survey respondents

Characteristic	Category	n (%)
Sex	Female	100 (83.3)
	Male	18 (15.0)
Age, years	18 – 30	22 (18.3)
	31 – 40	26 (21.7)
	41 – 59	38 (31.7)
	≥ 60	32 (26.7)
Length of residence, years	< 1	1 (0.8)
	1 – 3	7 (5.8)
	4 – 7	1 (0.8)
	8 – 10	3 (2.5)
	> 10	106 (88.3)
Education level	Elementary (Grade 1–6)	36 (30.0)
	High school	64 (53.3)
	Vocational	2 (1.7)
	College	17 (14.2)
	Doctoral	1 (0.8)
Civil status	Married	81 (67.5)
	Single	33 (27.5)
	Widowed	5 (4.2)
Municipality	Catanauan, Quezon	28 (23.3)
	General Luna, Quezon	22 (18.3)
	Macalelon, Quezon	22 (18.3)
	San Narciso, Quezon	49 (40.8)

Note: Totals may not equal 100% due to missing data.

Service utilization

Most respondents (90.8%, 109/120) reported receiving services from BHWs in the past six months, with monthly visits being most common (65.5%, 76/116). Consultations were the most frequently used service (86.7%, 104/118). Detailed utilization patterns are provided in Table 3. Additionally, 31.9% (n=38/119) had been referred to a health facility in the past three months. Among those, 89.5% (n = 34/38) had followed through. The most common reasons for referral included maternal health, non-communicable diseases, and child health.

Table 3 Frequency and type of BHW services used by community members

Category	n (%)
<i>Frequency of service from BHWs (n = 116)</i>	
Weekly	23 (19.8)
Monthly	76 (65.5)
Quarterly	8 (6.9)
Annually	9 (7.8)
<i>Types of BHW services received (n = 120)*</i>	
Consultation	104 (86.7)
Awareness-raising orientation	16 (13.3)
First aid	5 (4.2)
Other	8 (6.7)

*Respondents could select multiple services.

FGDs confirmed that BHWs provided a broad range of services routinely, including blood-pressure monitoring, medication distribution, child growth tracking, immunizations, and basic health education. Medication distribution was viewed as the most vital service, though its impact was limited due to frequent medicine shortage.

Satisfaction with BHWs

Most survey respondents (72.7 %, n = 85) reported being satisfied with BHW services, with nearly half (47.0 %, n = 55) “very satisfied.” Only 8.6 % (n = 10) were dissatisfied and 18.8 % (n = 22) felt neutral. The pattern was similar for the range of services offered: 70.9 % were satisfied or very satisfied and 5.9 % expressed dissatisfaction. Figure 1 visualizes the full distribution of ratings across five service types; the exact n (%) for every cell are provided in Additional file 4 (Table S1). “Consultation” received the highest

satisfaction (65.2 % satisfied or very satisfied) and dissatisfaction remained below 8 % for all core services.

Despite overall satisfaction, many respondents identified additional health services they need but are not currently provided by BHWs. These included mental health and stress counselling (42.5%, n = 51), regular mobile communication (39.2%, n = 47), HIV/AIDS counselling (20.0%, n = 24), and vaccine tracking (19.2%, n = 23), among others (Figure 2).

FGD participants reiterated their satisfaction with BHWs during the FGD, describing them as hardworking, responsive, and often willing to assist even beyond regular hours.

"When we really need them, like for blood pressure checking...they come to us, even at night." (Male, Catanauan)

They also emphasized their proactive efforts during health campaigns.

"When there are medical missions happening, they will let us know and even visit us at our house...like the ones where the BHWs are going to house the ones to partner with the TB-dots...they're really the good ones." – Female, San Narciso

The main concern identified was medication education. While distribution was appreciated, participants perceived that some BHWs lacked the training or confidence to explain prescriptions, leading to confusion³.

"Sometimes, when they are asked about what the medicine was for, they don't know. There are some prescriptions that they can't read. They need to know that." (Female, Macalelon)

"Some of them didn't know what the medicine [they were giving us] was for...they say, 'I don't know.'" (Female, San Narciso)

Ratings of BHW skills

Respondents rated BHW competencies positively across six skill areas, as shown in Figure 3. The detailed frequencies and percentages for these ratings are available as supplementary material (see Additional file 4, Table S2). Helpfulness received the highest proportion of "good" or "very good" ratings at 78.8%, followed by provision of relevant health information (75.2%), bias-free treatment (74.6%), communication (73.7%), punctuality (72.1%), and referral competence (61.2%). Negative assessments ("very poor" or "poor") were uncommon, ranging from 1.6% to 4.2%, and did not exceed 4.2% in any competency domain.

Trust in BHWs

Of 117 respondents, 47.0% (n=55) reported strong personal trust in BHWs, 31.9% (n=38) reported trust, 15.1% (n=18) were neutral and 5.0% (n=6) reported distrust. When asked whether the community trusts BHWs, 40.2% (n=47) said the community has strong trust, 32.5% (n=38) said trust, 23.1% (n=27) were neutral, and 4.3% (n=5) reported perceived community distrust.

Along with trust and satisfaction, FGD participants highlighted systemic issues that hinder service quality. A key concern was political interference in BHW appointments. Newly elected leaders often replace experienced workers, disrupting services and losing institutional knowledge:

"If the BHW is not the captain's ally, they would remove her and then a new BHW will be added. Those [replacements] are not knowledgeable about the work. But the old ones, who are really good at nurturing their patients, are the ones being removed." (Female, San Narciso)

Participants also pointed to low and inconsistent honoraria for the BHWs—typically ₱600–₱1,000 (\$10–\$17/month)—as a barrier to motivation and performance:

"...I guess some of them are a little bit lazy...in our barangay...they only get 600 pesos (\$10.30). We're just saying it's unfair. We were the barangay justices. So it seems the honorarium is small." (Female, Catanauan)

Barangay Health Workers

Socio-demographic profile of BHW survey participants

55 BHWs participated in the survey, the majority of whom were female (96.4%, n = 53). Ages ranged from 18 to over 60 years, with most (45.5%, n = 25) between 41–59 years and 21.8% (n = 12) over 60. Over half were married (67.3%, n = 37) and had completed secondary school (58.2%, n = 32). Length of service varied: 41.8% (n = 23) had more than 10 years of experience, while 25.5% (n = 14) had served for less than a year. BHWs lived in households of about 5 people (SD = 2.17; range: 1–11). Most participants walked to work (80%), while some others used tricycles/pedicabs (16.4%). Full demographic details of BHWs are shown in Table 4.

Table 4 Sociodemographic profile of Barangay Health Workers

Characteristic	Category	n(%)
Sex	Female	53 (96.4)
	Male	1 (1.8)
	Missing	1 (1.8)
Age (years)	18–30	6 (10.9)
	31–40	12 (21.8)
	41–59	25 (45.5)
	≥ 60	12 (21.8)
Length of service (years)	< 1	14 (25.5)
	1–3	9 (16.4)
	4–7	6 (10.9)
	8–10	3 (5.5)
	> 10	23 (41.8)
Education level	Elementary (Grade 1–6)	14 (25.5)
	High school	32 (58.2)
	College	9 (16.4)
Civil status	Married	37 (67.3)
	Single	12 (21.8)
	Separated	3 (5.5)
	Widowed / Legally divorced	3 (5.5)
Municipality	San Narciso, Quezon	17 (30.9)
	General Luna, Quezon	10 (18.2)
	Catanauan, Quezon	18 (32.7)
	Macalelon, Quezon	10 (18.2)
Mode of transportation to work	Walk	44 (80.0)
	Tricycle / Pedicab	9 (16.4)
	Other	2 (3.6)
Total participants	–	55 (100.0)

Scope of services

Over a three-month period, BHWs (n=46) conducted a median of 21 household visits, with high variability across participants (Mean = 34.3, SD = 43.2). During these visits, the most common services delivered were child health care (84.8%) and community mobilization (76.1%). Maternal health services (56.5%) were also frequently provided, while tasks like providing first aid (26.1%) or coordinating patient referrals (26.1%) were less common (Table 5). Over the same three-month period, BHWs (n = 46) referred an average of 3.1 patients to health facilities (SD = 4.4), though many made none and a few made up to 20. Referrals related to childbirth averaged 1.8 per BHW (SD = 2.6).

Table 5 BHW services delivered during household visits

Service Domain	Yes n (%)	No n (%)
Child health (nutrition, vaccination, general child-health care)	39 (84.8)	7 (15.2)
Childhood infectious diseases (cough, pertussis, communicable illnesses, parasitic infections in children)	19 (41.3)	27 (58.7)
Community mobilization (community rounds/household visits, coordination and engagement with residents)	35 (76.1)	11 (23.9)
Disease prevention (health promotion, immunization support, screening activities)	22 (47.8)	24 (52.2)
First aid (basic emergency care)	12 (26.1)	34 (73.9)
Health communication (pamphlets/leaflets for information dissemination)	15 (32.6)	31 (67.4)
Maternal health (pregnancy care, family planning)	26 (56.5)	20 (43.5)
Patient referral (referring clients to higher-level health facilities)	12 (26.1)	34 (73.9)

BHWs were highly active in broader community awareness-raising activities, particularly community mobilization (92.7%), child health (87.3%), and maternal health (85.5%) (Table 6).

Table 6 Community awareness-raising activities by BHWs

Awareness-raising activity	Yes, n (%)	No, n (%)
Community mobilization	51 (92.7)	4 (7.3)
Child health	48 (87.3)	7 (12.7)
Maternal health	47 (85.5)	8 (14.5)
Patient referral	46 (85.2)	8 (14.5)
Infectious diseases in childhood	44 (81.5)	10 (18.5)
First aid	43 (78.2)	12 (21.8)
Disease prevention	41 (74.5)	14 (25.5)
Health communication	39 (70.9)	16 (29.1)

During household visits, BHWs reported how often they encountered eleven common challenges. (“Never,” “Once a month,” “Weekly,” “Yearly”). BHWs most frequently encountered requests related to adult illness (32.5% weekly, n = 40), health goods or supplements (30.8% weekly, n = 39), and childhood illness (21.7% weekly, n = 46). Common monthly encounters included short-term family planning (66.7%, n = 54), childhood care (56.5%, n = 46), and clinic referrals (43.4%, n = 53). Less frequently addressed issues included permanent family planning (60.4% never, n = 53) and violence against women and girls (77.8% never, n = 54). See Table 7 for a full breakdown.

Table 7 Frequency of common issues encountered by BHWs

Issue domain	n	Never %	Yearly %	Monthly %	Weekly %
Request for health goods, supplements, or commodities	39	5.1	10.3	53.8	30.8
Adult acute or chronic illnesses	40	15.0	5.0	47.5	32.5
Childhood care and illnesses (fever, diarrhea, cough)	46	4.4	17.4	56.5	21.7
Short-term family-planning counselling (pills, condoms)	54	18.5	3.7	66.7	11.1
Health-promotion counselling (exercise, diet, hygiene)	40	20.0	17.5	40.0	22.5
Request for referrals to health clinic	53	15.1	28.3	43.4	13.2
Assessment of malnutrition & other child-nutrition needs	51	9.8	47.1	37.3	5.9
Pregnancy-related concerns (spotting, morning sickness, first-trimester issues)	53	34.0	34.0	26.4	5.7
Long-term family-planning counselling (IUD, DMPA)	54	27.8	42.6	27.8	1.9
Violence against women and girls	54	77.8	16.7	5.6	0.0
Permanent family-planning counselling (ligation, vasectomy)	53	60.4	35.9	1.9	1.9

The table shows the frequency of eleven common issues encountered by BHWs. The sample size for each issue varies (n = 39–54), as percentages are based only on the number of valid responses.

During FGDs, BHWs described their daily routines as closely integrated with community health needs. Their responsibilities included distributing maintenance medications from the DoH, monitoring child growth, conducting blood pressure checks, and coordinating referrals with RHUs, often beyond regular hours and formal settings. In areas lacking structured systems, BHWs saw themselves as both first responders and vital links to the formal health system.

“I was a former BHW leader...I’m the one who collected the data—for example, a list of hypertensive people and those who were using contraceptives. Then, for those who are sick, I take them to RHU, and after my work, I deliver medicines to give to people who have maintenance. Then, I came to Sitio for the monthly weighing of the child. Even at night, when someone calls me, I go to their house to check their blood pressure. Some of the pregnant women come with me for their check-ups at RHU, so we can tell the midwife that we have a pregnant patient.” BHW

Confidence in service delivery

BHWs rated their confidence on a 5-point likert scale (1 = No confidence, 2 = Little confidence, 3 = Some confidence, 4 = Confident, 5 = High confidence) across eight service areas. Confidence was highest in community mobilization (M = 4.6, SD = 0.7) and lowest in managing childhood infectious diseases (M = 3.8, SD = 1.2). All other domains scored at or above “Some confidence” (≥ 3.8) on average (Table 8).

Table 8 BHW self-reported confidence across service domains

Service Domain	Mean $\pm$ SD
Community mobilization	4.6 $\pm$ 0.7
Maternal health	4.3 $\pm$ 1.0
Child health	4.2 $\pm$ 1.0
Patient referral	4.1 $\pm$ 1.0
Disease prevention	4.0 $\pm$ 1.0
Health communication	3.9 $\pm$ 1.1
First aid	3.9 $\pm$ 1.1
Infectious diseases in childhood	3.8 $\pm$ 1.2

Across all eight core activities, confidence increased with age. BHWs aged 18–30 reported the lowest average scores (range: 2.7–4), while those 60+ reported the highest (range: 3.8–4.8). A full breakdown of confidence ratings by age group is available in Additional file 4, Table S3.

Perceived respect and trust from the community

BHWs generally reported high levels of satisfaction regarding the respect and trust they receive from community members. Over half (50.9%, n = 28) were "very satisfied," while 30.9% (n = 17) reported being "satisfied." The remaining 18.2% (n = 10) were “neutral”. During FGDS, BHWs described informal acknowledgments and gratitude from community members significantly boosted their morale and confidence, particularly when assisting patients in accessing care.

“They are thankful because we can accompany them. It’s like we’re making things easier for them (when they have check-ups). Because sometimes, if you’re not accompanied to the hospital, you won’t be seen right away.” (BHW, Female, San Narciso).

Training and certification history

60% (n=33) of BHWs reported receiving some form of training to improve health service quality and role-related certifications. Most certifications were from city or municipal health offices (78.8%, n = 26), followed by the Department of Health (39.4%, n = 13), provincial health offices (24.2%, n = 8), and NGOs (9.1%, n = 3).

FGD participants cited local governance instability as a major barrier to stable employment and accreditation. Frequent changes in *barangay* leadership often led to the replacement of even experienced BHWs—especially those without formal accreditation.

“So what happened—from the [redacted] resolution—is that BHWs have accreditations while BNS [Barangay Nutrition Scholar] do not. When there is a change in barangay captains, the BNS could be removed. As BHW, we have some support—just a little—but some BHW still get removed. But if you are accredited, your name is at the top (municipal, provincial, or regional level), and even if the captain has removed you, you have not been removed from the masterlist, so we can still get from the governor, even with those who are removed (at the barangay level), what we have as BHW.” (BHW, Female, General Luna)

Although national DOH policies aim to protect BHW roles, participants noted inconsistent enforcement at the *barangay* level, with local officials sometimes overriding accreditation. They emphasized that training and certification are vital investments in community health and should not be undermined by political turnover or weak policy implementation.

“The barangay health worker who is registered and accredited should not be removed. Because, ma’am, it’s a waste of the knowledge gained from the seminar, which the government spent on her. It was spent so that she could contribute to the community... They shouldn’t be removed.” (BHW, Female, General Luna)

Support received

Most BHWs received some support in the past year, primarily honoraria (96.4%, n = 53), equipment or materials (78.2%, n = 43), and seminars (65.5%, n = 36). A majority (87.3%, n = 48) found this support insufficient for basic needs. Among them, the most common concerns were high living costs (81.3%, n = 39), inadequate income (72.9%, n = 35), and limited income-generating skills (35.4%, n = 17). In FGDs, participants described their honoraria as low and inconsistent, typically between ₱600–₱800 (approximately \$10–\$14 USD). This financial strain was exacerbated by instances where BHWs used their personal funds to cover patients' urgent transport or medical costs.

“I always had to come with pregnant patients in labor... They don’t usually save money—basically, no money for transport fares... I had to pay for them... I had this experience when we arrived in the morning. I haven’t even had cash. My husband has to send us money through Gcash [digital financial service provider]. I once had to wear my slippers upside down in a hurry. [They had] No clothes [for the newborn clothes]. I said [to the patient], ‘you’ve been carrying that (the baby) for nine months... you should have planned—you should have spared money for savings.’” (BHW, Female, General Luna)

Participants also described delays or nonpayment of stipends, shortages of basic medicines, long wait times for replenishment, and politicized appointment that create job insecurity. These conditions exacerbate BHWs’ financial strain and impact their ability to deliver reliable care.

Digital access and literacy

Nearly all BHWs had access to a phone (94.4%, n = 51), and 81.8% (n = 45) owned one personally. All agreed mobile phone use is safe and acceptable for both men and women. However, none had completed training via a digital app or device. Most BHWs were familiar with using the internet and digital devices (92.7%, n = 51), but fewer felt confident doing so (internet: 79.3%, n = 42; devices: 81.8%, n = 45). Familiarity and confidence were also high for using social media and creating/sharing content. However, only a few were familiar with (43.6%) or confident in (38.2%) completing online forms. See Figure 4 for full breakdown.

All BHWs could make and receive calls independently. Most could handle texts (sending: 89.1%, n = 49; receiving: 92.7%, n = 51), though fewer were comfortable with more advanced tasks like downloading apps (67.3%, n = 37), handling mobile money (50.9%, n = 28), or email (43.6%, n = 24). See Figure 5 for full visualization.

Preferred mobile-application functionality

All nine proposed app features were rated positively. The most valued were a BHW registry (64.8% “extremely useful”), disease surveillance/contact tracing (63.6%), and supervision tools (63.0%). No features were rated “slightly useful,” and “moderately useful” never exceeded 13.7%. See Table 9 for a full breakdown.

Table 9 Perceived usefulness of proposed mobile-app features for BHWs

Feature	Extremely useful	Very useful	Moderately useful	Slightly useful
	n (%)	n (%)	n (%)	n (%)
Anonymous reporting mechanism (violence, discrimination, support)	31 (57.4)	19 (35.2)	4 (7.4)	0 (0.0)
BHW registry	35 (64.8)	17 (31.5)	2 (3.7)	0 (0.0)
Community forum to collaborate with colleagues	28 (54.9)	16 (31.4)	7 (13.7)	0 (0.0)
Decision trees for diagnosis	29 (52.7)	20 (36.4)	6 (10.9)	0 (0.0)
Disease surveillance/contact tracing	35 (63.6)	16 (29.1)	4 (7.3)	0 (0.0)
Learning & assessment digital certification	30 (56.6)	16 (30.2)	7 (13.2)	0 (0.0)
Learning & assessment refresher courses	31 (57.4)	18 (33.3)	5 (9.3)	0 (0.0)
Referral mechanism (BHW Method)	33 (63.5)	17 (32.7)	2 (3.8)	0 (0.0)
Supervision (reporting, instructions, updates from supervisors)	34 (63.0)	17 (31.5)	3 (5.6)	0 (0.0)

Percentages in the table are calculated based on the number of valid responses for each individual feature (n = 51–54).

Perceived training needs and priority topics for BHWs

BHWs expressed strong interest in further training across all topics aligned with the 2022 BHW Manual's seven core areas. Endorsement rates were uniformly high, ranging from 90.7% for routine household visits to 100% for topics such as bias-free family planning, hypertension, and WASH (see Additional file 4, Table S4 for full data). To further prioritize these needs, BHWs were also asked to rate the importance of 18 specific training topics. As shown in Table 10, over half of the sample rated all topics as “extremely important”. Topics related to child health were a clear priority.

Table 10 BHW importance ratings for additional training topics

Topic	Moderately imp. n (%)	Very imp. n (%)	Extremely imp. n (%)
Communication/counseling skills with patients/clients	7 (12.7)	18 (32.7)	30 (54.5)
Pregnancy nutrition	4 (7.3)	18 (32.7)	33 (60.0)
Pregnancy danger signs	3 (5.5)	21 (38.2)	31 (56.4)
Pregnancy prenatal care	2 (3.6)	19 (34.5)	34 (61.8)
Breastfeeding	0 (0.0)	18 (32.7)	36 (65.5)
Early childhood nutrition and development	5 (9.1)	18 (32.7)	31 (56.4)
Childhood illnesses – Diarrhea	1 (1.8)	19 (34.5)	32 (58.2)
Childhood illnesses – TB	1 (1.8)	15 (27.3)	36 (65.5)
Childhood illnesses – Fever	2 (3.6)	15 (27.3)	36 (65.5)
Childhood illnesses – Malnutrition & Stunting	3 (5.5)	15 (27.3)	35 (63.6)
Childhood illnesses – Dengue	3 (5.5)	14 (25.5)	35 (63.6)
Childhood illnesses – Measles	5 (9.1)	13 (23.6)	35 (63.6)
Childhood illnesses – Meningitis	5 (9.1)	15 (27.3)	33 (60.0)
Childhood illnesses – Pneumonia	5 (9.1)	13 (23.6)	34 (61.8)
First aid/injury care	5 (9.1)	18 (32.7)	31 (56.4)
Referrals and linkages to clinics	5 (9.1)	17 (30.9)	32 (58.2)
Family planning – different methods	4 (7.3)	16 (29.1)	35 (63.6)
Family planning – communication techniques	3 (5.5)	15 (27.3)	34 (61.8)

The key findings identified in the focus group discussions with community members and BHWs are consolidated in Table 11.

Table 11 Summary of focus group discussion themes and key findings

Group	Theme	Key findings
Community members (n = 8)	Scope of services	BHWs provide a broad spectrum of essential frontline services, including blood pressure monitoring, medication distribution, health education, etc.
	Satisfaction and perception	View BHWs as highly committed and responsive, often providing care outside of formal hours ("even at night") and proactively engaging with the community.
	Gaps in knowledge	Express concern that some BHWs lack the confidence or training to adequately explain medication instructions and potential side effects.
	Systemic barriers	Acknowledge that the low and irregular monthly honorarium is unfair, recognizing it as a key factor impacting BHW motivation or "laziness".
BHWs (n = 13)	Professional identity and workload	BHWs see themselves as a vital link between the community and the formal health system. Their responsibilities are extensive and demanding, often requiring them to work beyond their official scope and hours
	Importance of community trust	Informal community gratitude and trust boosts morale. Helping patients successfully navigate the health system builds validation.
	Job insecurity & governance	Political turnover can create instability; formal accreditation offers only partial and inconsistently enforced protection against dismissal.
	Financial issues	Face significant financial strain from low, irregular, and insufficient honoraria. Forced to use personal funds to cover patient-related costs which exacerbates strain.
	Training, resource & logistical Constraints	Effectiveness is hindered by gaps in training (which is scarce and informal) and resources (e.g., shortages of essential medicines and supplies).

Key informants

Interviews with health officials, BHW coordinators, and medical professionals highlighted systemic enablers and barriers affecting BHW service delivery. Four key themes emerged: (1) Support and Training, (2) Demand for Services, (3) Community Respect and Trust, and (4) System-Level Challenges and Recommendations. Table 12 summarizes the key themes, subthemes, and results identified.

Table 12 Key-informant interview themes and sub-themes overview

Theme	Subtheme	Key findings
1. Support and training for BHWs	Recruitment & onboarding	• Decentralized, volunteer-based start; new BHWs learn informally from peers or RHU staff. • Formal three-day training delayed by limited municipal budgets and slot shortages (often only one session/year).
	Certification processes	• Certification requires return demonstrations and written exams; certificates signed by local officials.
		• Regional training opportunities are scarce, leaving many eligible BHWs uncertified.
	Local government support	• Honoraria vary by <i>barangay</i> (based on IRA) and can be delayed or withheld for political reasons.
		• Some LGUs provide additional incentives (transport, insurance, free lab checkups); proposals exist for refresher courses and PhilHealth coverage.
2. Demand for health services	High-demand clinical services	• Maternal health, child immunizations, nutrition tracking, health education.
	Administrative & surveillance Roles	• Population census, master listing for immunization targets, and support insurance (PhilHealth) reporting and municipal health program monitoring.
	Unmet community needs	• Mental health cases lack community-level response; BHWs are not trained for first aid in remote or accident-prone areas.
3. Respect and trust for BHWs	Community trust	• BHWs are highly trusted frontline providers for routine services (e.g., vaccination, blood pressure monitoring) due to proximity and familiarity.
	Health professionals' perceptions	• Experienced BHWs viewed as competent; performance serves as feedback for supervisory staff. New BHWs are teachable but need guidance.
	Training & capacity Link	• Trust in BHWs depends on access to training, honoraria, and equipment; gaps in skills or confidence highlight structural constraints and the need for investment.
4. System-Level challenges & recommendations	Data reporting challenges	• Municipal demand for disaggregated, timely data clashes with handwritten, non-standardized registers, complicating accurate reporting.

Financial sustainability	• Inconsistent, delayed, or insufficient honoraria push BHWs to seek additional income or consider leaving their roles.
Recommendations	• Standardize data collection templates and train BHWs on reporting. • Explore cooperative models or alternative funding mechanisms to ensure timely stipends and reduce attrition.

Theme 1. Support and Training for BHWs

Recruitment and training. Recruitment and training for BHWs was characterized by a decentralized and resource-limited approach. Key informants described BHW onboarding as a largely informal process. Appointed by *barangay* captains, new BHWs often begin as unpaid volunteers, learning their duties through a peer-led apprenticeship under experienced BHW leaders or Rural Health Unit (RHU) staff. This informal period can be prolonged, as access to the mandated three-day formal training course is frequently delayed.

Early tasks include monitoring vital signs, recording basic health data, and maintaining health lists, with occasional support from DOH or HRH staff.

“For now, the training’s not available, but they manage to do their duty. The BHW leaders help newly appointed BHWs, accompany them in their duties. But if we have our duty on linang area, we teach the BHWs on duty and they listen every time we teach them.” (Midwife/BHW Coordinator, Female, General Luna)

“Starting from their appointment by the respective barangay captains, we have our barangay nurse’s duty at barangay. For them to be equipped, they need to have proper training. But if the training were not yet available, our barangays, DOH nurses...we’re the ones who taught them for a while.” (BHW Coordinator, Female, General Luna)

BHWs typically must complete one year of volunteer service before qualifying for formal training—a three-day program covering basic health services, return demonstrations, and assessments (pre- and post-tests). However, limited budgets mean municipalities often offer just one session per year, with too few slots for all eligible BHWs.

“That’s all we have budgeted for...only 50 slots, we can’t cover that 150 class” (BHW Coordinator, Female, General Luna)

“All the training is LGU initiative. We train them, we are also providing expenses for food while the barangays provide for the fare” (BHW Coordinator, Female, Macalelon)

Specialized training (e.g., mental health, outbreak response) is even scarcer and dependent on provincial-level funding. In its absence, local staff rely on “re-echoing” to informally pass on knowledge to peers and subordinates.

“We don't have...extra for those topics. We just wait for the province to give us and then we re-echo the information to our midwife, nurses; then they re-echo it to their respective barangays. But the training itself, we don't have...we don't have the budget.” (BHW Coordinator, Female, General Luna)

Certification processes. Upon completing formal training, BHWs are assessed through return demonstrations and written exams on clinical tasks like checking vital signs. Successful participants receive certificates, typically signed by the facilitator or municipal mayor. Due to resource constraints, opportunities for training are rare, leaving many uncertified.

“They have certification signed by the mayor or by the one who conducted the training... Aside from here (RHU), some have already attended the training at Lucena but for only selected BHWs.” (Midwife, Female, San Narciso)

Local government support. Financial support, primarily through honoraria, is inconsistent. The amount varies based on the *barangay's* Internal Revenue Allotment (IRA) and is vulnerable to political interference, leading to delayed or withheld payments.

“For barangay, they (BHWs) receive incentives. They have incentives depending on the barangay's IRA. When it comes to población, they receive 1000 pesos monthly. But due to politics' issue, some BHWs were declined by their barangay captain, those instances are unavoidable. There are other BHWs that receive honorarium from the municipality.” (BHW Coordinator, Female, General Luna)

Some municipalities supplement honoraria with transportation allowances, health insurance, and event support. However, BHWs often lack access to healthcare themselves. In response, several municipalities have proposed expanded benefits, including PhilHealth (insurance) coverage, free checkups, and lab services.

“As of today, we will be conducting a BHW refresher course... We are also starting our Resigned and Accreditation Committee (RAC). We are hoping to provide PhilHealth to all BHWs.” (BHW Coordinator, Female, General Luna)

Theme 2. Demand for health services

High-demand services provided by BHWs. Key informants described BHWs as indispensable frontline providers, meeting high demand for a range of essential health services and administrative functions. BHWs' proximity to communities is a key asset, enabling them to monitor health conditions regularly and respond quickly to emerging needs.

“Since they are living in the community, they are constantly seen as the frontliners in the health system, allowing them to have first access to those needing medical attention.” (BHW Coordinator, Female, General Luna)

Maternal health was identified as the area of greatest demand, in addition to vital signs monitoring, child immunization, nutrition tracking, and health education.

“There’s a lot of instances where the BHW prefers to accompany a pregnant woman to the hospital. It’s supposed to be the duty of a midwife, but they’re the one being called to.” (Midwife, Female, San Narciso)

Beyond clinical tasks, BHWs perform crucial administrative and surveillance roles vital for meeting municipal health targets. These include conducting the population census, creating master lists for immunization programs, health program reporting, and supporting labor-intensive nutrition monitoring initiatives like *Operation Timbang*⁴.

“For example, we need an actual population for the immunization program. For us to know...the accomplishment [report] will be the problem, when the region or province gives the target, it’s always a high target. That’s why we need the master listing from the BHWs, that’s their major role. In a way, that’s the highest level of service that we need because that will be our basis for accomplishment.” (BHW Coordinator, Female, San Narciso)

Unmet community needs. Some informants noted that BHWs lack the training to address key needs in mental health support and emergency first aid. This creates a critical service gap, particularly in remote or accident-prone locations.

“They are not familiar with [mental health]. But once they have, for example...the barangay kagawads (councilor) were the one who provided it for them. I just don’t have an idea if those cases were being referred by BHWs” (Nurse/BHW Coordinator, Female, Macalelon)

“First aid especially to those (communities) along the highways that are prone to accident area [is needed]. Our BHWs are not hands on because they don’t know how to respond to it. They are not trained for that. And, in a community on top of the mountains, what if there is someone to have a heart attack? What can they do? That’s what I can see for improvement.” (BHW Coordinator, Female, Macalelon)

Theme 3. Respect and trust for BHWs

Community trust. Health professionals reported that BHWs are highly trusted by community members and are often the first point of contact for health or medical concerns.

“The community members put a lot of trust in the BHWs. For example, there’s one community member in linang (remote area) who needs admission to hospital...I’m not based in that area, so...the BHWs there were the first ones who were called to.” (Midwife, Female, General Luna)

Trust was especially strong in relation to information dissemination (for e.g., schedules for vaccination, check-ups) and routine services like blood pressure monitoring.

Health professionals' trust and perceptions of BHW competence. Health workers expressed confidence in experienced BHWs, citing their ability to handle routine services and build strong community rapport. Their performance also provides valuable feedback to supervising staff.

"In the 2 barangay that I am handling I gave my full trust to all my BHW, knowing they are competent, and they are—that if there are problems on health issues that they don't know, they always refer it to me immediately also I believed that we develop a trusting work relationship." (BHW Coordinator, Female, Catanauan)

"For us midwives, it serves as feedback on our role if the BHWs can't perform their roles efficiently." (Midwife, Female, Macalelon)

One identified area of improvement was professionalism and communication, particularly in handling sensitive topics and interacting with health staff and community members.

"There's an instance that they (patients/ community members) are being bold about this, and we can't avoid it. For example, if I'm asking for a report for smoking, they will respond "Smoking too?". But although there are some, I always remind them to be more patient when it comes to explaining. If you explain it to them in a good manner, you cannot control those patients who are short-tempered" (Midwife, Female, Macalelon)

While some noted that newly appointed BHWs required more confidence and assistance, they were still seen as "teachable" and open to learning.

"Some [new BHWs] have an openness to be trained...some...are the sons/daughters of the BHWs that have been appointed to replace them...[they] are also teachable." (Midwife, Female, Macalelon)

"I personally trust them for some programs...with the basic and primary (programs), pregnant women, child nutrition they are confident with that. They can encourage the community to go to the health center for checkup, vaccination, services like that...but in other matters, they are not trained so we must give them assistance." (Midwife, Female, San Narciso)

Interviewees emphasized that trust in BHWs is closely tied to access to training and local government support. Skill and confidence gaps were seen as symptoms of broader structural issues. They felt that strengthening BHW capacity requires targeted LGU investment in training, honoraria, and equipment to improve BHW service delivery and sustain motivation.

"It's a need to give them extra support, because some barangay only provides 500 pesos for honorarium which cannot accommodate all their needs when giving services such as transportation expenses. They

also couldn't afford to do xerox so sometimes we're the ones who provided it. For small expenses, it's alright but it should be the barangay who will provide it for them.” (Midwife, Female, San Narciso)

“More training...[for]capacity building to boost their confidence like they can do such things (services) because they're trained in that. As I know I can do it because we've been educated regarding that. For me it's...more capacity building. More...training hands-on. When it comes to paper, they can already perform it so let's focus on action too (training).” (BHW Coordinator, Female, Macalelon)

Theme 4. System-level challenges and recommendations

Key informants identified systemic challenges that impede BHW effectiveness, primarily related to data management and financial sustainability. Specifically, the municipal demand for timely, disaggregated data clashes with the BHWs' reliance on handwritten, non-standardized records. This mismatch complicates accurate reporting and program monitoring.

“Some agents ask me for certain ages so I'm going to ask them (BHWs). The problem is that they cannot provide it immediately because of the master list. I'm hoping for at least...uniformity when it comes to templates of age range. Some of them are still handwritten, some have a different set-up so it would be challenging for them to count it. It's hard for them to identify which certain barangay or houses have these kinds of cases because they're not able to write it” (Health professional, Female, General Luna)

A more pressing challenge is the financial precarity of the BHW role. Low, delayed, or inconsistent honoraria was seen as a key factor that pushed BHWs to seek other work and consider leaving. In response, some LGUs proposed forming cooperatives to provide supplemental income and peer support. While these initiatives were still in early stages, professionals hoped such mechanisms could reduce attrition and improve wellbeing.

“I'm hoping for them to have a cooperative... wherein the BHWs were able to help each other. But I don't know where to start, it's good if they have an extra means of money. That's still up in the discussion with Doc... I'm hoping for some support for their capital to help them to have a good income. You know that their honorarium will not be enough... 500 would be enough but it's still small and then sometimes it's given to them delayed. So sometimes, I pity them, and I can't hold back when they want to work in other places and to work abroad because life's hard.” (Health professional, Female, Macalelon)

Conclusion

This mixed-methods baseline study engaged BHWs, community members, and local health officials to conduct the first assessment of digital readiness, service delivery, and structural barriers facing BHWs in Quezon Province, Philippines, the findings highlight three key insights: (1) BHWs are widely utilized, trusted, and embedded in community health systems; (2) their ability to provide consistent, quality care is constrained by inadequate training, certification, compensation, and governance instability; and (3)

there is strong interest and basic infrastructure for digital transformation, but weak digital skills and poor system integration can limit effectiveness. These findings identified baseline indicators for the HEAL Hub and have informed the program's design, phased implementation, and broader strategies for strengthening health systems in resource-limited settings.

Discussion

BHWs are extensively relied upon in the communities surveyed. The majority (90.8%) of community respondents had accessed BHW services in the past six months, most frequently for consultations. Trust and satisfaction were high, and the majority of BHWs had served in the communities for over 10 years. These results mirror broader evidence that CHWs, when locally embedded and socially proximate, can serve as effective conduits of primary care [4, 48]. However, this high utilization is not necessarily matched by role alignment. Although BHWs self-reported preventive activities as a significant part of their service, community members primarily utilized and expressed the highest satisfaction with curative care, with 'consultation' being the most common. This suggests the community's prioritization of immediate health needs actively shapes the BHWs' day-to-day activities, potentially overshadowing their preventive and promotive health activities. This pattern echoes findings from other CHW programs globally, where preventive activities are deprioritized due to time constraints, supply gaps, or lack of immediate tangible outputs [49]. For the HEAL Hub project, this highlights the importance of supporting BHWs on two fronts: enhancing their capacity to deliver the curative care their communities seek, while also reinforcing their fundamental role in health promotion and prevention.

Despite widespread community appreciation, the data reveal mismatches between expected and actual capacities of BHWs. Community members rated BHWs' interpersonal attributes (e.g. helpfulness) more favorably than their technical competencies. Self-assessments reinforced this as BHWs expressed high confidence in community mobilization but lower confidence in more technical skills like managing childhood infectious diseases and administering first aid. Two service areas in particular expose this gap: referrals and first aid. BHWs and community members rated referral competency poorly, and few BHWs reported issuing referrals. However, when referrals were made, patient adherence was very high (90%), suggesting that the barrier lies not in community behavior, but in unclear triage protocols, limited referral training, and the lack of feedback from facilities, which is a pattern observed in other CHW programs [50, 51]. First aid competence follows a similar trend. Despite being part of the formal BHW mandate, only a quarter of BHWs had administered first aid in the previous quarter, and self-confidence in this skill was low. Key informants emphasized the urgency of this gap given that BHWs often serve as the only frontline responders during emergencies in Quezon. Mental health and stress counseling emerged as the most frequently cited unmet need among community members. This finding echoes a growing body of global evidence showing that emotional and psychological distress is a major, yet often unaddressed, component of community health needs in low-resource settings [52]. In the Philippines, mental health care remains nascent and under-resourced, especially in rural settings, despite policy reforms such as the 2018 Mental Health Act [53, 54].

This study attributed such healthcare gaps to fragmented, infrequent training and unclear role expectations that leave BHWs under-prepared. The wide range of household visits and the difference between the median (21) and the mean (34.3) suggest significant workload disparities among BHWs, with some managing far larger caseloads than others. Furthermore, in the absence of a national induction process or mandated core competencies, training access remains highly uneven [17, 18]. Only 60% of BHWs in this sample reported receiving formal training and certification, with many relying on informal peer mentoring or self-directed learning. This ad hoc approach results in wide variation in both skill and confidence, particularly among newly appointed BHWs, who consistently reported lower self-assessed confidence across key service areas [21]. Although experienced BHWs (41.8% of whom have served for more than a decade) fill the training void through informal mentorship, this strategy places additional strain on an already overstretched workforce and is no substitute for structured, competency-based training [55]. These findings echo global evidence that fragmented and inconsistent CHW training undermines both service quality and system integration [17, 21, 56]. Considering the growing community and BHW interest in digital health tools, these challenges highlight the opportunity for scalable, technology-enabled training platforms. However, addressing these gaps will require not only new digital training content and certification (e.g., HEAL Hub modules/certification), but also broader reforms to fund and institutionalize standardized induction, continuing education, and formal competency assessment as prerequisites for service.

The most critical constraints identified in this assessment are structural, particularly around compensation, governance, and institutional support. This reflects a broader reality for BHWs across the Philippines, a situation articulated by Myrna Gaite, president of the National Federation of Barangay Health Workers, who recently stated that “We’ve served our communities for almost four decades, most of us without pay, without benefits, and without protection” [57]. Although BHWs are legally designated as “volunteers” under RA No. 7883, in practice, they shoulder significant responsibilities with inadequate resources. The typical honorarium was ₱600 (around USD \$10) per month, which 87.3% of BHWs reported as insufficient to meet their basic needs. Payments were often delayed, and many BHWs reported using personal funds to cover patient transport or medical costs, creating what has been termed a “shadow subsidy” to the health system [17, 19]. While community trust in BHWs remains high, their performance often depends on individual goodwill rather than systemic reliability [58, 59]. Practices such as paying out-of-pocket for patient needs or working beyond official hours reflect “role stretch” [60, 61], a symptom of health system fragility rather than resilience. Though communities value these extra efforts, they raise sustainability, safety, and responsibility concerns. Quezon’s community members and local stakeholders as well as global evidence link poor compensation and support to burnout, attrition, reduced motivation, and poor performance [17, 18, 62, 63]. Ultimately, this threatens the long-term sustainability of community health systems by exposing workers to exploitation and weakening public trust.

Governance instability further compounds the precarious state of community health systems. BHW appointments are often tied to *barangay* leadership and vulnerable to political turnover, as evidenced following the 2023 elections [25]. Our data confirmed that even experienced and accredited BHWs face

dismissal after local leadership changes, undermining continuity of care and wasting scarce training investments. Such abrupt turnover risks framing BHWs as interchangeable rather than skilled essential health workers. In our sample, 96% of BHWs were women, aligning with national estimates [12] and global CHW workforce patterns. Research indicates that CHW duties are often perceived as extensions of women's caregiving roles, reinforcing underinvestment and devaluation of their role [21, 64]. Women are disproportionately assigned time and labor-intensive tasks, typically with inadequate compensation or institutional support [64]. Our findings reflect the dynamics reported in research as BHWs reported irregular pay, political precarity, limited advancement, and a lack of formal labor protections. Furthermore, women's underrepresentation in local governance may also limit their ability to "organize and take a seat at the policy table" [65]. As Colvin et. al [21] point out, "these beliefs ensure that women bear the brunt of the care burdens and suffer the bulk of the associated financial, physical, and psychological costs of caring."

These structural vulnerabilities damage institutional trust and have direct implications for digital health initiatives like HEAL Hub. Trust is foundational to CHW effectiveness and by extension, any new digital element of their work. Even when BHWs are trusted, this may not automatically transfer to new technologies. While BHWs are well-positioned to serve as digital health ambassadors, their success depends on community engagement, cultural alignment, perceived safety, adequate training, management support, and the compatibility of technology with existing roles and practices within health systems [66].

BHWs in this study demonstrate a strong commitment to their communities and enthusiasm for capacity-building, especially through digital tools. Nearly all BHWs owned a mobile phone and rated each of the nine proposed HEAL Hub functions as useful, with the highest enthusiasm for a BHW registry, disease-surveillance dashboards, and structured referral workflows; these are all features that map directly onto well documented service gaps. Notably, the strong endorsement of an anonymous reporting mechanism indicates a concurrent priority for tools that address issues of worker vulnerability and systemic accountability. BHWs also expressed near-universal interest in additional digital and skill training, particularly in non-communicable diseases, mental health, and family planning. Still, readiness involves more than device ownership as fewer than half felt of the respondents felt confident completing relevant online tasks (e.g. e-forms or email). This mirrors multi-country evidence showing that access is necessary but not sufficient; structured, ongoing capacity-building predicts uptake and perceived impact [34].

Workflow alignment is equally critical. When digital platforms duplicate paper processes or disrupt daily routines, CHWs report increased workload and diminished value, as seen with redundant electronic forms in Brazil [38] and misaligned incentives in Kenyan programs [32, 40]. In our study, stakeholders highlighted data management and master-listing as promising entry points for digital augmentation, provided it streamlines rather than adds tasks. Finally, affordability remains a tangible barrier. For BHWs earning irregular stipends that are insufficient for basic living expenses, the recurring costs of data, app

use, and device maintenance can stall adoption. Notably, the 28-country CHW survey identified out-of-pocket expense as a key determinant of digital uptake [34].

Thus, for digital health platforms like HEAL Hub to have sustainable impact, they must be designed through participatory co-creation with frontline workers and thoughtfully integrated with their workflows and capacities. Offline-first capabilities, financial subsidies for data or repairs, and tiered learning in response to literacy and competency frameworks are also essential. Without this, digital health initiatives risk failing to meet their objectives and may inadvertently exacerbate the very inequities they aim to resolve. As the WHO emphasizes, digital tools must support and strengthen existing health systems, not bypass or burden them [27]. Most importantly, HEAL Hub cannot be deployed as a standalone technological solution. Its implementation requires advocating for structural reforms needed to professionalize and stabilize the essential frontline workforce. Technology alone is not transformation. It is a tool that is only as effective as the system and the people who apply it with purpose.

Strengths and limitations

Several limitations should be considered when interpreting the study findings. First, its purposive sampling and focus on four municipalities limit generalizability beyond Quezon.

Second, cross-sectional data preclude causal inference, and reliance on self-reported measures introduces risks of social desirability and bias. Finally, data collection occurred prior to the implementation of the Magna Carta of BHWs, potentially missing early effects of this policy change.

Despite these limitations, this study offers key strengths. By integrating survey, focus-group, and interview data across three stakeholder groups: BHWs, community members, and key health officials, we provide the first systematic assessment of digital readiness and service-delivery barriers among rural BHWs in Quezon. Second, deploying KoBoCollect's offline data-capture capabilities minimized transcription errors and supported real-time validation in low-connectivity settings. Third, our locally led data collection and analysis by CARE Philippines and STPRC helped increase the cultural and operational sensitivity of the study. Finally, joint interpretation sessions with local partners and stakeholders helped anchor our conclusions in on-the-ground realities and strengthen their credibility in policy and practice. Most critically, the study provides a robust baseline against which the forthcoming HEAL Hub implementation can be evaluated and offers important implications for future similar interventions.

Implications for policy

Our findings on BHW precarity and political vulnerability lend empirical urgency to the full and robust implementation of the Magna Carta of BHWs. This legislation represents a critical opportunity to address the implementation failures of previous laws (e.g., RA 7883). Multiple studies, including this baseline, show that many local governments remain unaware of, or simply ignore, these obligations [22]. We recommend that the Department of Health issue time-bound compliance circulars to LGUs and

mandate quarterly reporting on stipend disbursement, benefit coverage, and BHW-to-household ratios. Such measures are vital to dismantle political patronage and transform BHWs from a precarious volunteer position into a professionalized, compensated cadre of the formal health system.

Implications for practice

Program implementers should use a human-centered approach to co-design digital tools that mitigate documented barriers for BHWs. The HEAL Hub platform must have offline-first functionality and be deployed with financial support to prevent new costs. To build clinical capacity, it should integrate competency-based micro-learning on low-confidence topics. The tool must also try to streamline and reduce administrative burdens. Furthermore, features like data dashboards and the BHW registry can be leveraged as advocacy tools to support BHW demands for job security and support. Finally, to boost retention, programmatic support could pilot initiatives like BHW-led cooperatives to buffer income volatility and enhance economic stability.

Implications for research

This study opens several avenues for future scholarly inquiry. First, research is needed to audit LGU compliance with the Magna Carta and to model its effects on workforce retention, service quality, and community health outcomes. Second, rigorous impact evaluations are warranted to assess the effectiveness of the HEAL Hub on various metrics but especially unmet needs. Third, longitudinal inquiries are needed to explore how the processes of professionalization and digitalization affect the agency and lived experiences of the women who comprise this essential workforce.

Abbreviations

BHW – Barangay health worker

CHW – Community health worker

DoH – Department of Health

DHIS2 – District Health Information Software 2

FGD – Focus group discussion

HEAL Hub – Healthy, Empowered, Accredited, Linked Hub

IRA – Internal Revenue Allotment

KII – Key informant interview

LGU – Local government unit

LMIC – Low- and middle-income country

mHealth – Mobile health

NGO – Non-governmental organization

NCD – Noncommunicable disease

PhilHealth – Philippine Health Insurance Corporation

RA – Republic Act

RHU – Rural health unit

STPRC – Southern Tagalog People’s Response Center

TB – Tuberculosis

UNDRR – United Nations Office for Disaster Risk Reduction

WHO – World Health Organization

WHO-WPRO – World Health Organization – Western Pacific Regional Office

WASH – Water, sanitation, and hygiene

Declarations

Ethics approval and consent to participate: This study received ethical clearance from CARE Philippines. The study was conducted in accordance with the Declaration of Helsinki, and all methods were performed in accordance with the relevant guidelines and regulations. Written informed consent was obtained from all participants prior to data collection.

Consent for publication: Not Applicable. This manuscript does not contain any individual person's data in any form (including any individual details, images, or videos) that could compromise anonymity.

Availability of data and materials: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

Funding: This study was funded by Takeda Pharmaceuticals. The funder had no role in the study design, data collection, analysis, interpretation, or manuscript preparation.

Authors’ contributions: PJ led the manuscript drafting and conducted secondary data analysis. SS and FTM contributed substantive editorial input and critical revisions. FTM, AM, and MTB provided project leadership and supported initial data collection, coordination, and interpretation. All authors reviewed and approved the final manuscript and are accountable for its accuracy and integrity.

Acknowledgements: The authors thank the Barangay Health Workers, community members, and health officials in Quezon Province for their time and insights. We also acknowledge the Southern Tagalog People's Response Center who collected and entered data as important partners in the Philippines. We thank Tafadzwa Matova for his assistance in compiling the baseline dataset. We also acknowledge Patricia Medina for leading baseline data analysis and report preparation.

References

1. World Health Organization. Tracking universal health coverage: 2023 global monitoring report [Internet]. Geneva: World Health Organization; 2023 [cited 2025 Jul 18]. Available from: <https://www.who.int/teams/health-systems-governance-and-financing/health-financing/monitoring-universal-health-coverage>
2. World Health Organization. Financial protection [Internet]. [cited 2025 Jul 18]. Available from: <https://www.who.int/health-topics/financial-protection>
3. World Health Organization. Health workforce [Internet]. 2023 Oct 3 [cited 2025 Jul 18]. Available from: <https://www.who.int/news-room/fact-sheets/detail/health-workforce>
4. Scott K, Beckham SW, Gross M, Pariyo G, Rao KD, Cometto G, et al. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. *Hum Resour Health*. 2018;16(1):39. doi:10.1186/s12960-018-0304-x
5. Gilmore B, McAuliffe E. Effectiveness of community health workers delivering preventive interventions for maternal and child health in low- and middle-income countries: a systematic review. *BMC Public Health*. 2013;13:847. doi:10.1186/1471-2458-13-847
6. Vaughan K, Kok MC, Witter S, Dieleman M. Costs and cost-effectiveness of community health workers: evidence from a literature review. *Hum Resour Health*. 2015;13(1):71. doi: 10.1186/s12960-015-0070-y
7. Perry H, Morrow M, Davis T, Borger S, Weiss J, DeCoster M, et al. Care groups II: a summary of the child survival outcomes achieved using volunteer community health workers in resource-constrained settings. *Glob Health Sci Pract*. 2015;3(3):370–81. doi: 10.9745/GHSP-D-15-00052
8. Mallari E, Lasco G, Sayman DJ, Amit AML, Balabanova D, McKee M, et al. Connecting communities to primary care: a qualitative study on the roles, motivations and lived experiences of community health workers in the Philippines. *BMC Health Serv Res*. 2020;20(1):860. doi: 10.1186/s12913-020-05699-0
9. Evangelista LS, Serafica R, Reyes AT, Fudolig M, Kawi J, Sy F. Addressing the elephant in the room: structural racism and health disparities in the Philippines. *Int Forum Nurs Healthc*. 2022;5:14–6. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC10072864/>
10. Serafica R, Reyes AT, Cacciata MC, Kawi J, Leyva EWA, Sy FS, et al. Bridging the gap: reducing health inequities in access to preventive health care services in rural communities in the Philippines. *J Transcult Nurs*. 2025;36(1):24–33. doi: 10.1177/10436596241271270.

11. Lakshminarayanan R. Decentralisation and its implications for reproductive health: the Philippines experience. *Reprod Health Matters*. 2003;11(21):96–107. doi:10.1016/s0968-8080(03)02168-2
12. UNI Global Union – Philippine Liaison Council. UNI urges Philippine Senate to approve bill protecting community care workers [Internet]. 2023 Sep 26 [cited 2025 Jul 18]. Available from: <https://uniglobalunion.org/news/uniplc-support-community-care/>
13. Republic Act No. 7883: Barangay Health Workers' Benefits and Incentives Act of 1995. 1995. Available from: <https://elibrary.judiciary.gov.ph/thebookshelf/showdocs/2/2888>
14. Dayrit MM, Lagrada LP, Picazo OF, Pons MC, Villaverde MC. *The Philippines health system review*. New Delhi: World Health Organization, Regional Office for South-East Asia; 2018.
15. Pepito VCF, Loreche AM, Legaspi RS, Guinanan RC, Capeding TPJZ, Ong MM, et al. Health workforce issues and recommended practices in the implementation of Universal Health Coverage in the Philippines: a qualitative study. *Hum Resour Health*. 2025;23(1):21. doi:10.1186/s12960-025-00988-3
16. Closser S, Sultan M, Tikkanen R, Singh S, Majidulla A, Maes K, et al. Breaking the silence on gendered harassment and assault of community health workers: an analysis of ethnographic studies. *BMJ Glob Health*. 2023;8(5):e012502. doi:10.1136/bmjgh-2023-011749
17. Ballard M, Odera M, Bhatt S, Geoffrey B, Westgate C, Johnson A. Payment of community health workers. *Lancet Glob Health*. 2022;10(9):e1242. doi:10.1016/S2214-109X(22)00311-4
18. Ballard M, Olaniran A, Iberico MM, Rogers A, Thapa A, Cook J, et al. Labour conditions in dual-cadre community health worker programmes: a systematic review. *Lancet Glob Health*. 2023;11(10):e1598–e1608. doi:10.1016/S2214-109X(23)00357-1
19. Robredo JP, Ong B, Eala MA, Naguit RJ. Outmigration and unequal distribution of Filipino physicians and nurses: an urgent call for investment in health human resource and systemic reform. *Lancet Reg Health West Pac*. 2022;25:100512. doi:10.1016/j.lanwpc.2022.100512
20. Miranda AV, Nugraha RR, Sirmareza T, Rastuti M, Praha RD, Asmara R, et al. Valuing community health workers (CHWs): opportunity costs and out-of-pocket spending among CHWs in the Indonesian stunting prevention program. *Clin Epidemiol Glob Health*. 2025;33:101982. doi:10.1016/j.cegh.2025.101982.
21. Colvin CJ, Hodgins S, Perry HB. Community health workers at the dawn of a new era: 8. Incentives and remuneration. *Health Res Policy Syst*. 2021;19(Suppl 3):106. doi:10.1186/s12961-021-00750-w
22. Baliola MY, Golpe MR, Advincula-Lopez LV. Gains and challenges of the Barangay Health Worker (BHW) program during COVID-19 in selected cities in the Philippines. *Philipp J Health Res Dev*. 2024;38(1):13–26. doi:10.56808/2586-940X.1060
23. Hartigan-Go K, Valenzuela S, Prieto ML. Important but neglected: a qualitative study on the lived experiences of barangay health workers in the Philippines [Preprint]. SSRN; 2023. Available from: <https://ssrn.com/abstract=4461587>
24. Encinas-Franco J, Laguna EP. *Barriers to Filipino women's political participation*. San Francisco: The Asia Foundation; 2023. Available from: <https://cids.up.edu.ph/wp->

25. Cervantes F. New village leaders unjustly dismiss 80K health workers – solon. Philippine News Agency [Internet]. 2023 Nov 29. Available from: <https://www.pna.gov.ph/articles/1214532>
26. UNI Global Union. Philippine Senate approves Magna Carta of Barangay Health Workers on final reading [Internet]. UNI Global Union; 2025 [updated 2025 Mar 5]. Available from: <https://uniglobalunion.org/news/philippines-approves-magna-carta-of-bhws/>
27. World Health Organization. WHO guideline recommendations on digital interventions for health system strengthening [Internet]. Available from: https://www.who.int/health-topics/digital-health#tab=tab_1
28. Dimagi. The CommCare evidence base for frontline workers overview [Internet]. 2022. Available from: <https://www.dimagi.com/commcare-evidence-base/>
29. Borkum E, Sivasankaran A, Sridharan S, Rotz D, Sethi S, Manoranjini M, et al. *Evaluation of the information and communication technology (ICT) continuum of care services (CCS) intervention in Bihar*. Princeton, NJ: Mathematica Policy Research; 2015. Available from: <https://ideas.repec.org/p/mpr/mprres/2e2826deedb94ee18890653d81cb601a.html>
30. Hackett K, Lafleur C, Nyella P, Ginsburg O, Lou W, Sellen D. Impact of smartphone-assisted prenatal home visits on women's use of facility delivery: results from a cluster-randomized trial in rural Tanzania. *PLoS One*. 2018;13(6):e0199400. doi:10.1371/journal.pone.0199400.
31. Tian H, Zhang K, Zhang J, Shi J, Qiu H, Hou N, et al. Revolutionizing public health through digital health technology. *Psychol Health Med*. 2025;1–16. doi:10.1080/13548506.2025.2458254
32. Bakibinga P, Kamande E, Kisia L, Omuya M, Matanda DJ, Kyobutungi C. Challenges and prospects for implementation of community health volunteers' digital health solutions in Kenya: a qualitative study. *BMC Health Serv Res*. 2020;20(1):888. doi:10.1186/s12913-020-05711-7
33. Owoyemi A, Osuchukwu JI, Azubuike C, Ikpe RK, Nwachukwu BC, Akinde CB, et al. Digital solutions for community and primary health workers: lessons from implementations in Africa. *Front Digit Health*. 2022;4:876957. doi:10.3389/fdgth.2022.876957.
34. Blondino CT, Knoepfmacher A, Johnson I, Fox C, Friedman L. The use and potential impact of digital health tools at the community level: results from a multi-country survey of community health workers. *BMC Public Health*. 2024;24(1):650. doi:10.1186/s12889-024-18062-3
35. Yi S, Yam ELY, Cheruvettolil K, Linos E, Gupta A, Palaniappan L, et al. Perspectives of digital health innovations in low- and middle-income health care systems from South and Southeast Asia. *J Med Internet Res*. 2024;26:e57612. doi:10.2196/57612
36. Agarwal S, Perry HB, Long LA, Labrique AB. Evidence on feasibility and effective use of mHealth strategies by frontline health workers in developing countries: systematic review. *Trop Med Int Health*. 2015;20(8):1003–14. doi:10.1111/tmi.12525
37. Godinho MA, Ansari S, Guo GN, Liaw ST. Toolkits for implementing and evaluating digital health: a systematic review of rigor and reporting. *J Am Med Inform Assoc*. 2021;28(6):1298–307. doi:10.1093/jamia/ocab010

38. Santos R, Ribeiro L, Amado C, Mélló L, Santos L. Working conditions of community health workers in a digital health context: old and new challenges. *Interface (Botucatu)*. 2024;28. doi:10.1590/interface.240074
39. Labrique A, Vasudevan L, Mehl G, Roskam E, Hyder AA. Digital health and health systems of the future. *Glob Health Sci Pract*. 2018;6(Suppl 1):S1–4. doi:10.9745/GHSP-D-18-00342
40. Bakibinga-Gaswaga E, Bakibinga S, Bakibinga DBM, Bakibinga P. Digital technologies in the COVID-19 responses in sub-Saharan Africa: policies, problems and promises. *Pan Afr Med J*. 2020;35(Suppl 2):38. doi:10.11604/pamj.2020.35.2.23158
41. Evio BD, Bonito SR. Formative evaluation of the implementation of eHealth in the Philippines: a qualitative study. *Acta Med Philipp*. 2024;58(12):35–47. doi: 10.47895/amp.v58i12.9289
42. Lim Q. HealthTech in the Philippines [Internet]. Santa Monica (CA): Milken Institute; 2024 Aug 21 [cited 2025 Jul 18]. Available from: <https://milkeninstitute.org/content-hub/research-and-reports/reports/healthtech-philippines>
43. Department of Health. *National objectives for health Philippines 2023–2028*. Manila, Philippines: Department of Health; 2023. Available from: <https://thepafp.org/wp-content/uploads/2025/07/National-Objectives-for-Health-2023-2028.pdf>
44. Yumen NM. Computer literacy for Barangay Health Workers: supporting the Philippines' digital health transformation. *Aloysian Interdiscip J Soc Sci Educ Allied Fields*. 2025;1(5):195–214. doi:10.5281/zenodo.15508037
45. Philippine Statistics Authority. Philippine Standard Geographic Code: Quezon Province (0405600000) [Internet]. Quezon City: PSA. Available from: <https://psa.gov.ph/classification/psgc/citimuni/0405600000>
46. Department of Health, Department of the Interior and Local Government, Philippine Health Insurance Corporation. *Joint Administrative Order No. 2021-0001: Guidelines on the implementation of telemedicine in the delivery of individual-based health services*. Manila, Philippines: Department of Health, Republic of the Philippines; 2021. Available from: <https://law.upd.edu.ph/wp-content/uploads/2022/06/DOH-DILG-PHIC-Joint-Administrative-Order-No-2021-0001.pdf>
47. KoBoToolbox. (2024). *KoBoToolbox* [Computer software]. Retrieved from <https://www.kobotoolbox.org>
48. Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Annu Rev Public Health*. 2014;35:399–421. doi:10.1146/annurev-publhealth-032013-182354
49. Shrestha P, Afsana K, Weerasinghe MC, Perry HB, Joshi H, Rana N, et al. Strengthening primary health care through community health workers in South Asia. *Lancet Reg Health Southeast Asia*. 2024;28:100463. doi:10.1016/j.lansea.2024.100463
50. Give C, Ndimba S, Steege R, Ormel H, McCollum R, Theobald S, et al. Strengthening referral systems in community health programs: a qualitative study in two rural districts of Maputo Province, Mozambique. *BMC Health Serv Res*. 2019;19(1):263. doi:10.1186/s12913-019-4076-3

51. Jarolimova J, Baguma S, Patel P, Mian-McCarthy S, Ntaro M, Matte M, et al. Completion of community health worker initiated patient referrals in integrated community case management in rural Uganda. *Malar J*. 2018;17(1):379. doi:10.1186/s12936-018-2525-9
52. Patel V, Saxena S, Lund C, Thornicroft G, Baingana F, Bolton P, et al. The Lancet Commission on global mental health and sustainable development. *Lancet*. 2018;392(10157):1553–98. doi:10.1016/S0140-6736(18)31612-X
53. Lally J, Tully J, Samaniego R. Mental health services in the Philippines. *BJPsych Int*. 2019;16(3):62–4. doi:10.1192/bji.2018.33
54. Alibudbud R. Towards transforming the mental health services of the Philippines. *Lancet Reg Health West Pac*. 2023;39:100868. doi:10.1016/j.lanwpc.2023.100935
55. Sultan MA, Miller E, Tikkanen RS, Singh S, Kullu A, Cometto G, et al. Competency-based education and training for Community Health Workers: a scoping review. *BMC Health Serv Res*. 2025;25(1):263. doi:10.1186/s12913-025-12217-7
56. Afzal MM, Pariyo GW, Lassi ZS, Perry HB. Community health workers at the dawn of a new era: 2. Planning, coordination, and partnerships. *Health Res Policy Syst*. 2021;19(Suppl 3):103. doi:10.1186/s12961-021-00753-7
57. Cabalza D. Congress hit for failing to pass Magna Carta for Barangay Health Workers. Philippine Daily Inquirer. 2025. Available from: <https://newsinfo.inquirer.net/2070362/congress-hit-for-failing-to-pass-magna-carta-for-barangay-health-workers>
58. Okello DRO, Gilson L. Exploring the influence of trust relationships on motivation in the health sector: a systematic review. *Hum Resour Health*. 2015;13(1):16. doi: 10.1186/s12960-015-0007-5
59. Gilson L. Trust and the development of health care as a social institution. *Soc Sci Med*. 2003;56(7):1453–68. doi:10.1016/S0277-9536(02)00142-9
60. Glenton C, Javadi D, Perry HB. Community health workers at the dawn of a new era: 5. Roles and tasks. *Health Res Policy Syst*. 2021;19(Suppl 3):128. doi:10.1186/s12961-021-00748-4
61. Draper CE, Soepnel L, Mabetha K, Motlhatlhedhi M, Nkosi N, Lye SJ, et al. “You go an extra mile”: a qualitative study of community health worker perspectives in a health promotion intervention in urban South Africa. *BMC Health Serv Res*. 2024;24(1):1641. doi:10.1186/s12913-024-12127-0
62. Singh D, Negin J, Otim M, Orach CG, Cumming R. The effect of payment and incentives on motivation and focus of community health workers: five case studies from low- and middle-income countries. *Hum Resour Health*. 2015;13:58. doi:10.1186/s12960-015-0051-1
63. Steege R, Taegtmeier M, McCollum R, Hawkins K, Ormel H, Kok M, et al. How do gender relations affect the working lives of close to community health service providers? Empirical research, a review and conceptual framework. *Soc Sci Med*. 2018;209:1–13. doi: 10.1016/j.socscimed.2018.05.002.
64. Ahmed S, Chase LE, Wagnild J, Akhter N, Sturridge S, Clarke A, et al. Community health workers and health equity in low- and middle-income countries: systematic review and recommendations for policy and practice. *Int J Equity Health*. 2022;21(1):49. doi: 10.1186/s12939-021-01615-y

65. Jackson R, Kilsby D, Hailemariam A. Gender exploitative and gender transformative aspects of employing Health Extension Workers under Ethiopia's Health Extension Program. *Trop Med Int Health*. 2019;24(3):304–19. doi:10.1111/tmi.13197
66. Ratshidi L, Grobbelaar S, Botha A. Conceptualising the factors influencing community health workers' preparedness for ICT implementation: a systematised scoping review. *Sustainability*. 2022;14(14):8930. doi:10.3390/su14148930.

Footnotes

1. <https://www.fantaproject.org/monitoring-and-evaluation/sampling>
2. KoBoCollect mobile application (KoBoToolbox, <https://www.kobotoolbox.org>)
3. Under current policy, BHWs are not authorized to prescribe medications. The appropriate measure to be taken is to refer the patients in need of medication to health professionals in RHUs.
4. Operation Timbang (OPT) Plus is an annual program where health workers measure the weight and height of children under five to identify malnutrition. The data collected is then used to develop and implement targeted local nutrition action plans.

Figures

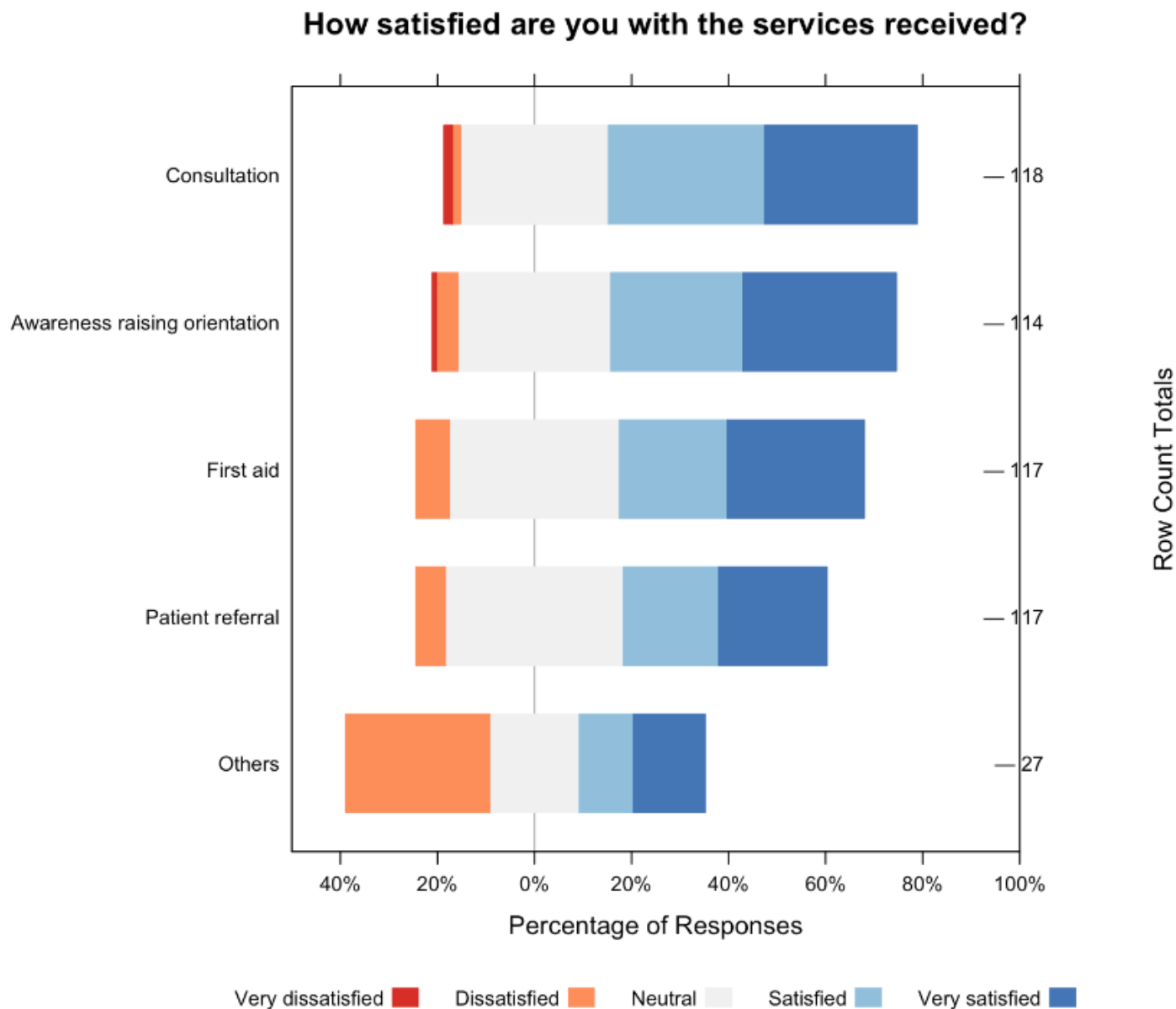


Figure 1

Community respondent satisfaction across five BHW service types. Stacked bars show column percentages (n = 27–118); left segments denote dissatisfied, right denote satisfied. Exact n (%) in Additional file 4 (Table S1).

Unmet community health service needs

Community members reporting each service as unmet (n = 120)

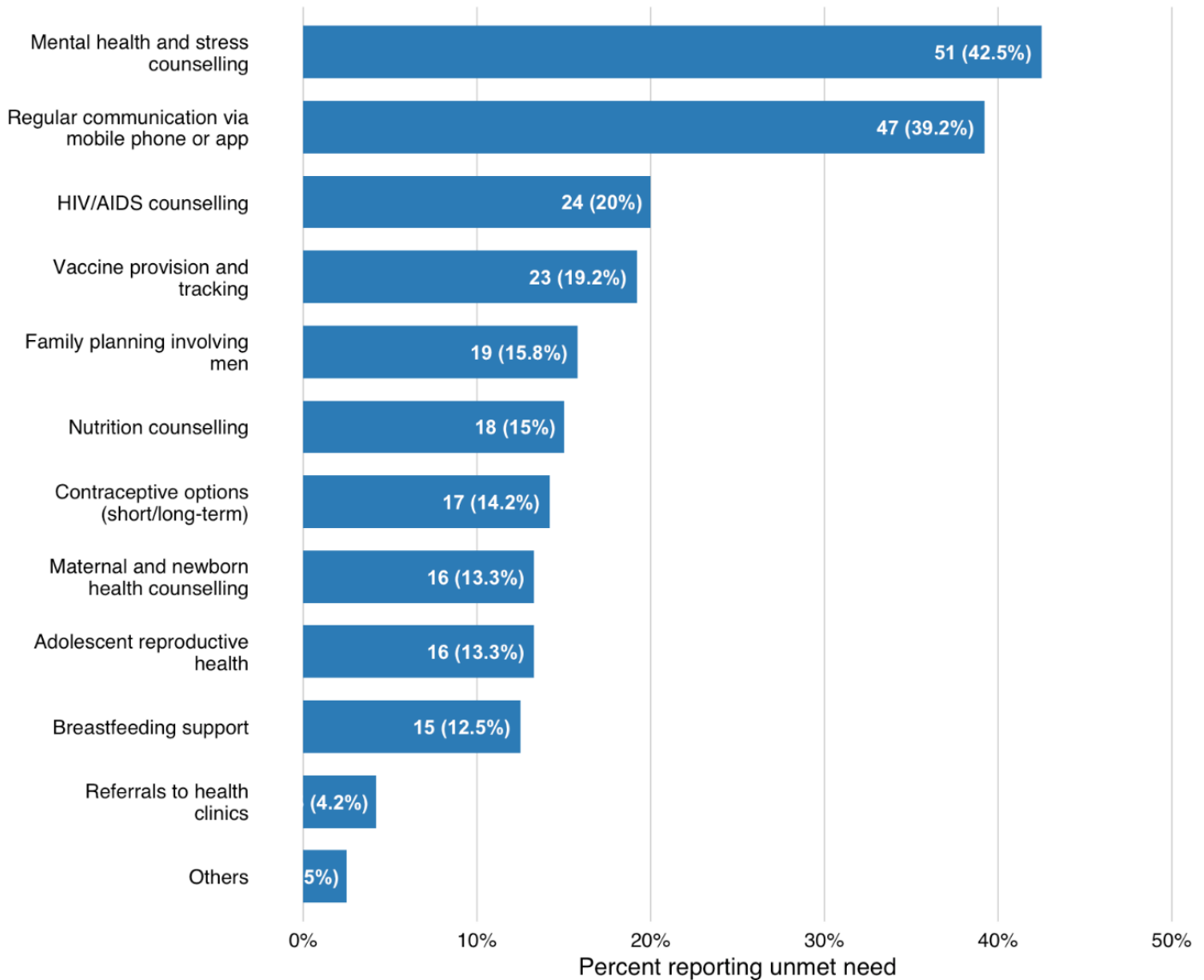


Figure 2

Unmet health service needs reported by community members. Bars show the percentage of respondents who identified each health service as needed but not provided by BHWs.

How would you rate the following aspects?

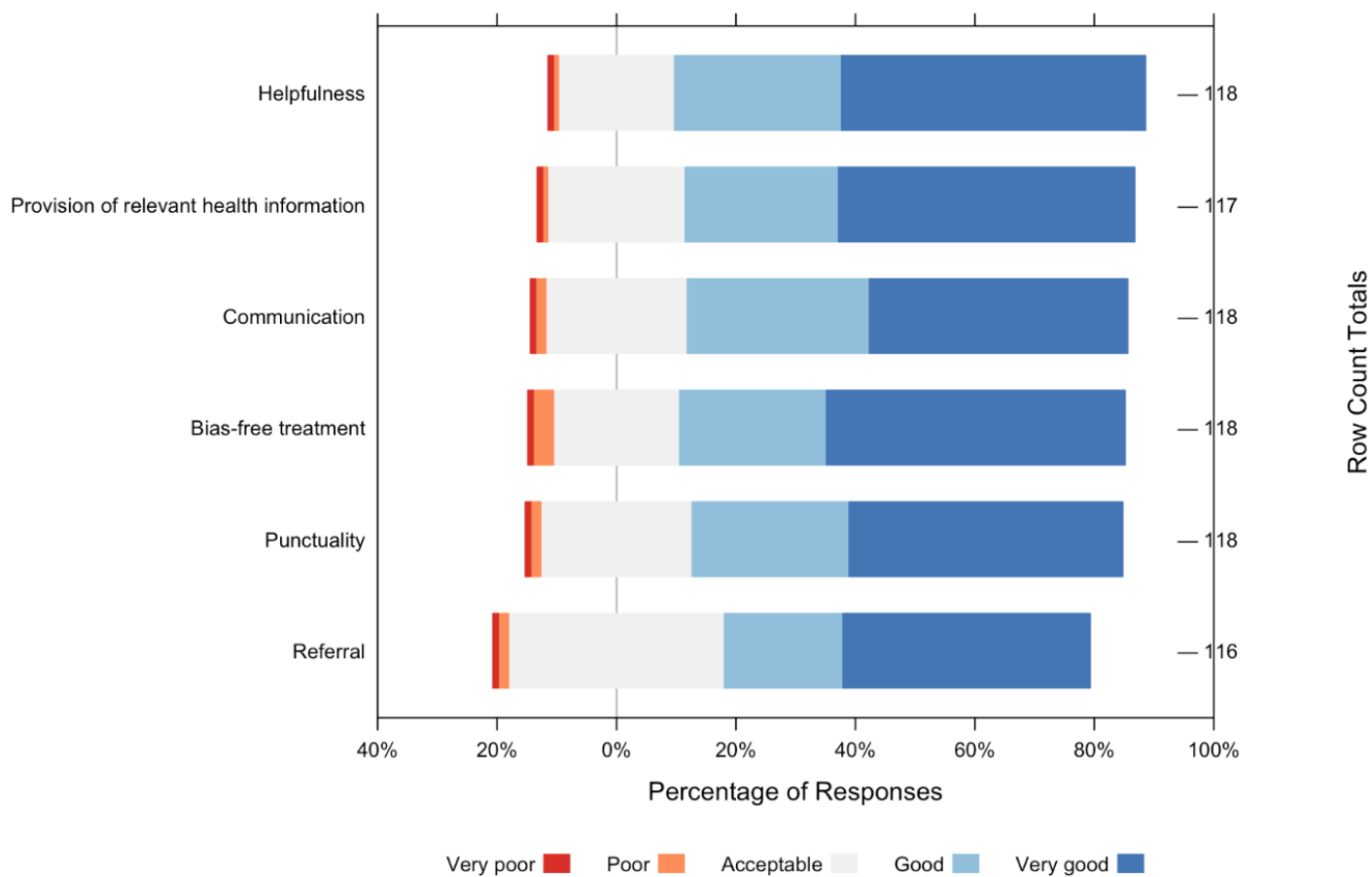


Figure 3

Community member ratings for six BHW competencies. Stacked bars show column percentages across five satisfaction categories (n = 116–118 per competency); exact n (%) in Additional file 4 (Table S2).

BHW digital task familiarity and confidence

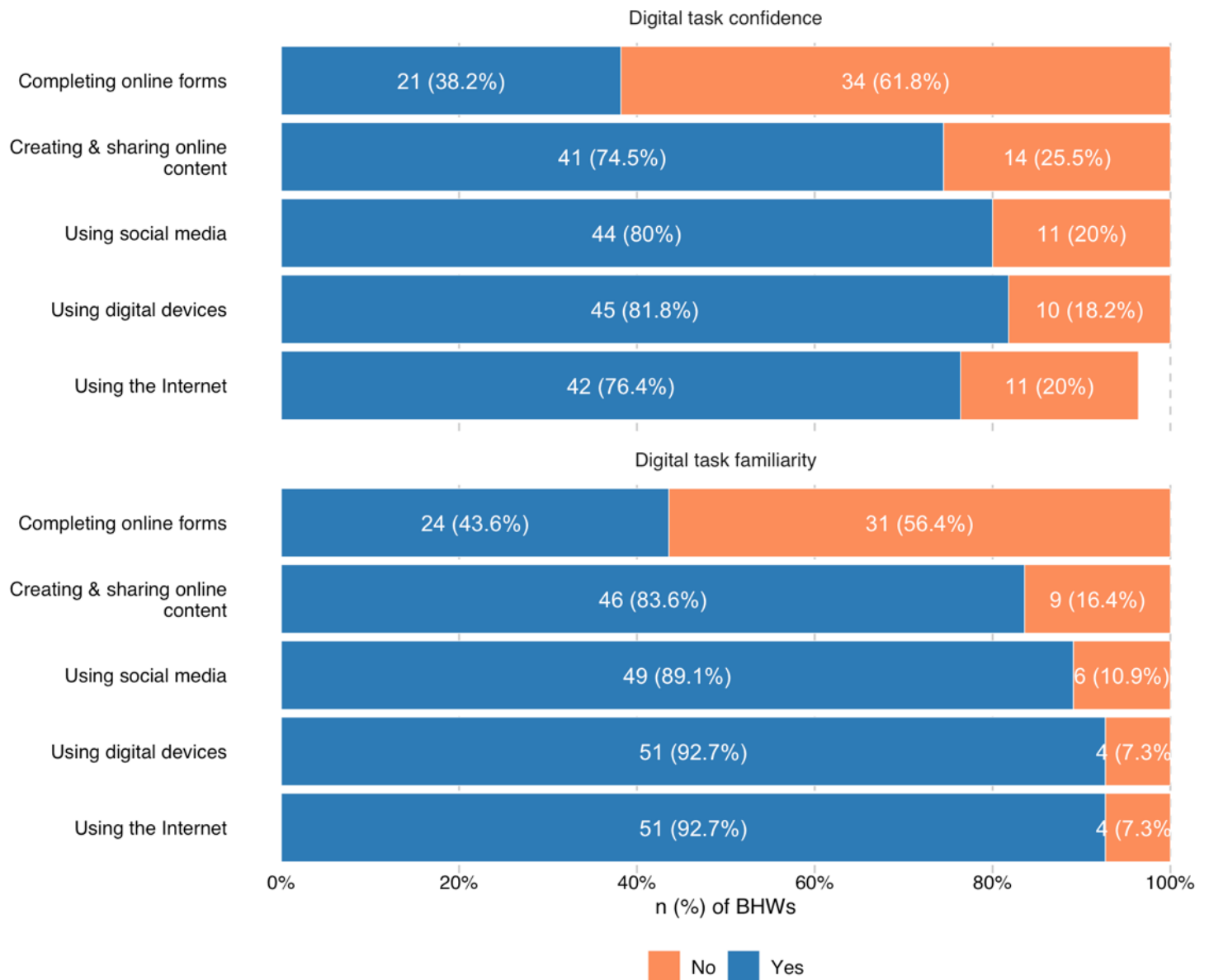


Figure 4

BHW digital task familiarity and confidence. The chart displays the percentage of BHWs (n = 55) who reported being familiar with and confident in performing five digital tasks.

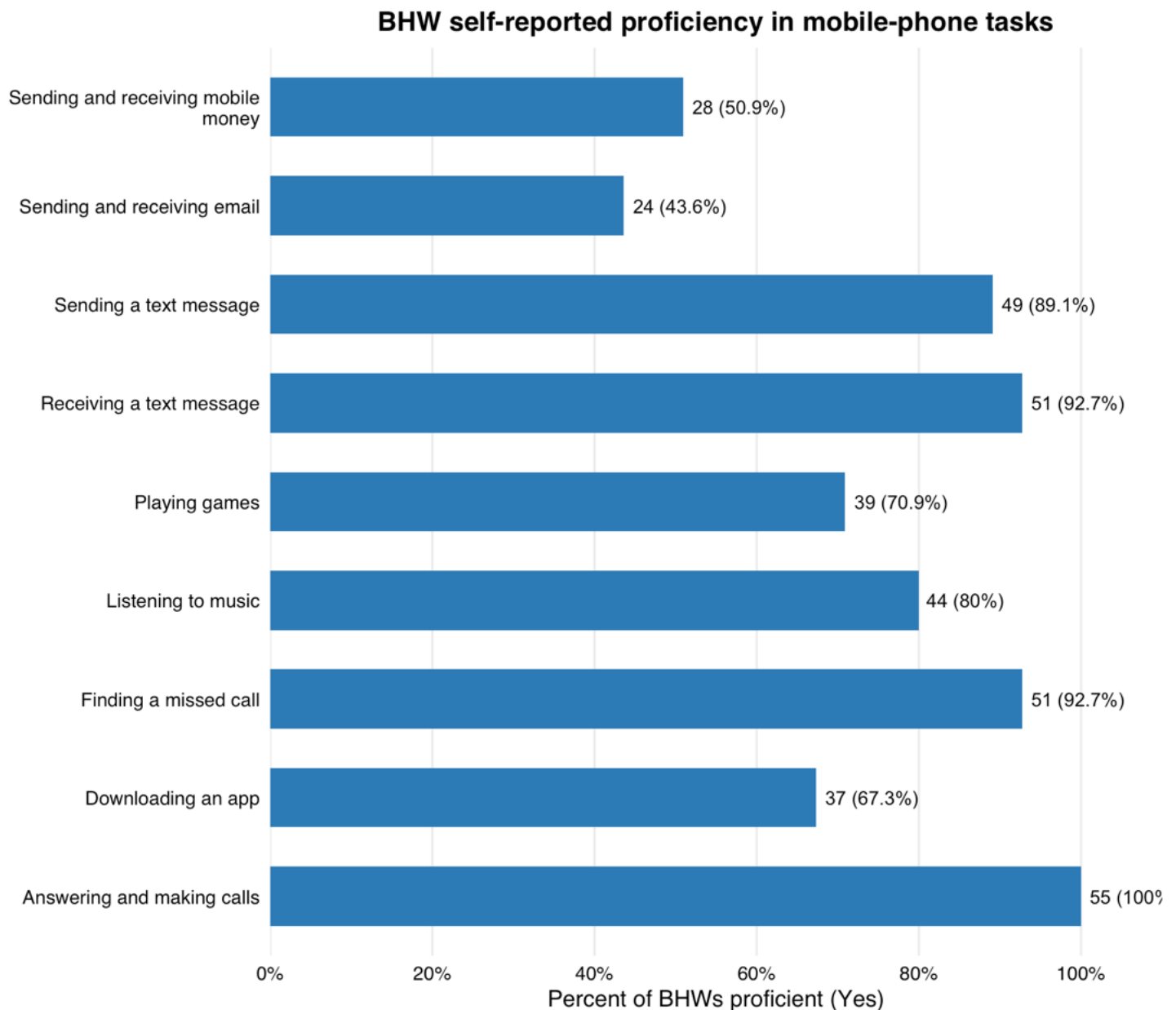


Figure 5

Self-reported proficiency of Barangay Health Workers in common mobile-phone tasks. Bars are ordered from lowest to highest percentage proficient (“Yes”), and each bar is labeled with the count and percentage (n %).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [HEALHubBMCAAdditionalFile1.docx](#)
- [HEALHubBMCAAdditionalFile2.docx](#)
- [HEALHubBMCAAdditionalFile3.docx](#)

- [HEALHubBMCAAdditionalFile4.docx](#)