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A proposed service model for early identification of autism spectrum disorder in ethnic communities in Southern Israel

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Abstract

Early autism spectrum disorder (ASD) detection is a precondition for effective intervention and facilitates significant improvements in functioning. In Israel, toddlers undergo general developmental screening by public health nurses (PHNs) at maternal and child health centres (MCHCs). Nevertheless, there are disparities among ethnic groups in the reported incidence of ASD. By means of an ecological model (EM), we identified strategies that improve ASD detection in the Bedouin community by investigating the social and policy factors that affect diagnosis. We conducted in-depth interviews with 18 policy makers and service providers and three focus groups of PHNs and paediatricians. We mapped the strategies for identifying toddlers with ASD based on the three EM levels. Correlations were established by comparing the codes within and between the EM levels. At the macro-level, the policy makers' strategy for improving ASD detection in the Bedouin community reflected the ideology, values and goals of the PHNs and included the MCHCs as the sole institution involved in detecting ASD. At the meso-level of the service providers, the key elements of the strategy consisted of actualising the professional potential of PHNs and patients' case management. At the micro-level was the population that utilises the services and complies with recommendations. A correlation was established between the PHNs' values and goals and patients' case management. Actualising their professional potential influenced the population's compliance. To reduce gaps in ASD diagnosis between Bedouin communities and the general population, it is necessary to identify and change the policy factors that influence access to services for children with ASD at every EM level while incorporating PHNs from the Bedouin community in future services. Culturally appropriate policies, screening policies and interventions must be developed to serve the needs of Bedouin children.

KEYWORDS
detected autism spectrum disorder, ecological model, policy, public health nurses

1 | INTRODUCTION

Autism spectrum disorder (ASD) is one of the most common developmental disorders (American Psychiatric Association, 2013). One of the challenges of ASD is the difficulty of obtaining an early and precise diagnosis. Children on the autistic spectrum are frequently diagnosed several years after the appearance of symptoms (Baio et al., 2018). Early identification and diagnosis are a precondition for effective intervention that improves functioning and developmental outcomes.

The prevalence of ASD over time varies by country. While the prevalence of autism has increased in Israel (Davidovitch, Hemo, Manning-Courtney, & Fombonne, 2013; Raz, Weisskopf, Davidovitch, Pinto, & Levine, 2015) and the United States (Baio et al., 2018), the prevalence in UK (Taylor, Jick, & MacLaughlin, 2013) and Sweden (Lundström, Reichenberg, Anckarsäter, Lichtenstein, & Gillberg, 2015) over the past decade has remained stable.

However, surveys in the United States have revealed that ASD may be underdiagnosed or unrecognised in ethnic minorities and populations of low socioeconomic status (SES) than in the general population (Baio et al., 2018; Wiggins et al., 2019; Zablotsky et al., 2019).

The reasons for these observed differences in ASD rates are manifold and include: cultural (Begeer, Bouk, Boussaid, Terwogt, & Koot, 2009; Matson et al., 2011), parental knowledge and/or language barriers (Zuckerman et al., 2017), sensitivity of various ASD screening instruments (Rea, Armstrong-Brine, Ramirez, & Stancin, 2019) and access to healthcare services (Liptak et al., 2008).

The factors that promote detection and increase in prevalence rates have been attributed largely to improved awareness of the disorder among parents, caregivers and physicians (Kogan et al., 2018; Leonard et al., 2010) an awareness that may be more pronounced in higher income and/or educated populations.

In Israel, the prevalence of ASD varies with geographical location and among different ethnic populations. For example, the reported ASD incidence rate in central Israel (20.6/10,000) is higher than the rates in southern (15.3/10,000) and northern Israel (12.6/10,000). In addition, there are fewer reported cases among low SES groups than among higher SES groups (Kerub et al., 2018) and fewer reported cases among Arabs and ultra-Orthodox Jews than in the general population (Davidovitch et al., 2013; Raz et al., 2015).

The population of southern Israel consists of two main ethnic groups: Jews and Arab Bedouins. There are approximately 19,000 births per year in this region, distributed evenly between these two groups (Central Bureau of Statistics, 2019). However, the number of children diagnosed with ASD in the Jewish population is four times higher than the number diagnosed in the Bedouin community (Meiri et al., 2017).

Israel provides a comprehensive, population-based early childhood health and development program that includes the monitoring of general developmental milestones and other preventive screening measures and routine immunisations. The service is provided free of charge by public health nurses (PHNs). Approximately 97% of children born in Israel routinely visit maternal and child health centres (MCHCs) for global developmental screening based on age-appropriate milestones from birth to age 6 (Ministry of Health, Southern Health District & Israel Center for Disease Control, 2008). In the southern district of Israel, the percentage of the population that utilise these services is identical in the Jewish and Bedouin populations. Global developmental screening is effective for the early identification of developmental issues and makes early intervention possible (Hagan et al., 2007). However, its use is inconsistent, and nurses vary in their decisions to refer children to specialists when developmental delays are identified (Kerub et al., 2018).

The Ministry of Health in the southern district and Soroka University Medical Centre (SUMC) in the southern Israel recently launched a project to bridge the gaps in diagnosis and increase early identification of Bedouin children with ASD by means of a tool called the Modified Checklist for Autism in Toddlers with Follow-Up (M-CHAT/F) (Robins et al., 2014). The use of this tool is currently not included in the Ministry's general recommendations. Toddlers who test positive for ASD receive additional tests conducted by Bedouin PHNs who are part of the multi-professional staff of the Medical Centre psychiatric unit for toddlers.

1.1 | The ecological model

Using an EM can deepen our understanding of early childhood developmental issues by revealing the interactions between personal environmental factors and system-based factors. These interactions may influence and shape the individual's identity (McLeroy, Bibeau, Steckler, & Glanz, 1988). Bronfenbrenner divides the environment into three types of relationships (Bronfenbrenner, 1992): microsystems, the systems in which children grow up that directly influence

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What is already known about this topic?

- Despite the rising prevalence of autism in the general population, the prevalence in ethnic populations remains low.
- The use of the MCHAT R/F questionnaire for autism detection has been found effective in ethnic populations (Mohamed et al., 2016; Nygren et al., 2012; Samadi & McConkey, 2015).
- Leveraging the benefits of maternal and child health centres in southern Israel to detect Bedouin children with autism will reduce the gaps between Bedouin populations and the general population.
- The realisation of the professional potential and development of public health nurses from the ethnic population will contribute to reducing the diagnostic gaps in autism between this population and the general population.

their development; macrosystems, the culture, ideology, rules and norms of the greater society in which children live and mesosystems, the interactions between the systems that affect children. An individual's entire ecological environment consists of concentric circles with the individual at their shared centre. This approach emphasises the different layers of the environment, each of which affects the child's development. The interaction and reciprocal relationships between the factors in the family environment or the immediate community and social landscape nourish the child's development. Changes or conflicts in any layer may cause fluctuations in the other layers (Bronfenbrenner, 1989). The EM helps healthcare providers understand these interactions and how they affect health outcomes (Golden, McLeroy, Green, Earp, & Lieberman, 2015). This model is often used in the field of public health to identify problems and shape interventions (Greenwood-Hickman Renz, & Rosenberg, 2015; Saligheh, McNamara, & Rooney, 2016).

While various studies described the barriers to the detection of ASD in ethnic and minority populations, this study discusses strategies for promoting child detection with ASD.

Little is known about the factors that promote the detection and diagnosis of ASD in Bedouin children. In this study, we examined how the EM can be used to identify strategies that promote ASD diagnosis in ethnic populations by examining the social factors that shape the diagnosis of children with ASD.

2 | METHOD

Utilising a qualitative approach **and thematic analysis**, we conducted in-depth interviews with 18 Israeli policy makers, directors of healthcare and welfare institutions, diagnosticians and caregivers. The interviewees played active roles in decision-making at the government and district levels and were involved in identifying children with ASD and providing diagnostic services to children in southern Israel. In addition, we conducted three focus groups (FGs), two with PHNs from MCHCs and one with paediatricians from the primary HMOs that serve the Bedouin communities in southern Israel.

We developed questions for the in-depth interviews and the FGs in an iterative process. The FGs involved structured discussions that lasted between 60 and 90 min with six to seven participants and resulted in a wide range of observations about their experiences (Krueger, 2014; Nassar-McMillan & Borders, 2002). The semi-structured in-depth interviews lasted 45–120 min each and focused on interviewees' individual experiences and perspectives.

Thematic analysis is a widely used analytic method. Its popularity partly reflects its independence from any particular theoretical approach or epistemology persuasion (Braun & Clarke, 2006). For this reason, it will be useful to researchers who position their work within either realist or constructionist paradigms within the social sciences (Braun & Clarke, 2006). In the context of exploring voluntary civic participation, thematic analysis is useful because it enables us to examine, from a constructionist methodological position, the meanings that people attach to their civic participation, the

significance it has in their lives and, more broadly, their social constructions of it. At the same time, it also enables us to examine how these constructions might reflect the 'reality' of participants' lived experiences, the material or social contexts in which they live and which constrain and enable their opportunities for civic participation (Evans & Lewis, 2018).

2.1 | Recruitment of participants

We invited 70 PHNs from the MCHCs and 20 paediatricians who worked at HMOs in the Bedouin communities to participate in the FGs. Twelve nurses and seven physicians (16 women and 3 men, 7 Bedouins and 12 Jews) took part in the FGs. Participants' experience of working with Bedouin populations ranged from 2 to 26 years ($m = 11$ for nurses, $m = 16$ for physicians).

Twenty policy makers and directors of healthcare and welfare institutions, diagnosticians and caregivers were invited to be interviewed. We interviewed 18 participants, (3 Bedouins and 15 Jews, 4 men and 14 women) whose experience working with Bedouin populations ranged from 1 to 25 years of ($m = 9.3$ years). The interviews were held in locations determined by the interviewees. The group of interviewees who participated in this study do not constitute a representative sample; however, all Bedouin workers were asked to participate in the study.

To guarantee confidentiality, we coded the interviewee's names with a letter and a number (e.g. D1, D2) prior to the transcription of the audio files. We checked the quality of the transcription of the interviews by simultaneously listening to the recordings and reading the transcripts of two to three of the interviews from the sample.

The FG discussions were transcribed verbatim. Three of the authors (OK, AR and ND) conducted a thematic analysis. Triangulation of the coding of the three authors ensured inter-rater reliability. We also reached a consensus regarding statements that included more than one code. We used the themes that emerged to create an EM that describes the strategies that promote the identification of children with ASD in the Bedouin community. The EM map illustrates the interactions and relationships between the themes and within the various layers of the EM.

2.2 | Correlation measurement

Once we had codified the themes, we compared them within and among the three levels of the EM (macro, meso and micro). We then explored the similarities that we found to establish the correlations and their directionality.

3 | RESULTS

Each of the three levels of the EM contains strategies that can help identify children with ASD and shape the service model (Figure 1).
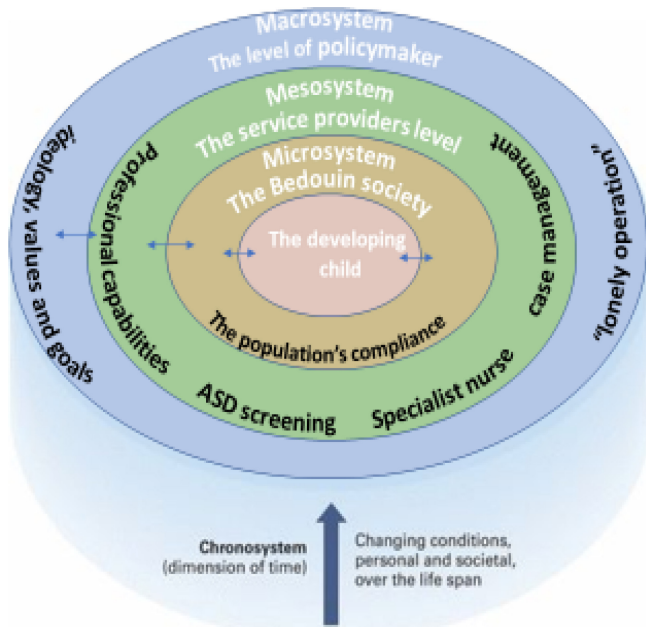
FIGURE 1 The strategies map to detect children with autism spectrum disorder (ASD) according to the ecological model. Macro-level strategies: the ideology, values and goals of the public health nurses (PHNs) and maternal and child health centres (MCHCs) as the sole institution involved in ASD identification. At the meso-level, of service providers: The key factors are realising the professional potential of PHNs and patient portfolio management. At the micro-level, the population that uses the services and complies with its recommendations

Since the results obtained from Jewish and Bedouin interviewees were identical, they were analysed together.

The highlighted texts below contains illustrative excerpts from the interviews.

3.1 | Macro-level Strategies

3.1.1 | The ideology, values and goals of the PHNs

The values and goals of the PHNs have a strong impact on the service they provide.

> We are individuals who work in professions governed by ideology and values. We, as representatives and defenders of the population, should take a strong stance on these values. Otherwise, it will further weaken persons in populations that are already weak. (D19, policy maker)

Part of the professional identity of the PHNs is their role in defending disadvantaged communities. Without their advocacy, the situation of these communities would be much worse.

The MCHC has a clear goal. We should identify every child who is not developmentally normal. We cannot identify autism. Therefore, it is clear that additional tools are needed for the early detection of autism so that we can provide broader and more comprehensive service for needy communities. (D19, policy maker)

To implement these goals, the PHNs require better screening tools. There is also a need to develop an official government policy for the professional training of nurses in ASD screening. In addition, preventive services must be adjusted to meet the needs of those who require additional supervision and guidance.

> We identify the children with developmental delays and try to link them up with the best possible caregivers and treatments in the field or provide them with the necessary information. We also advise patients about their rights regarding what they are entitled to receive. (D6, policy maker)

The nurses refer children suspected of having developmental delays to an expert for assessment and provide parents with information on the diagnostic stages, the practicing experts in the field and their rights during the processes of diagnosis and treatment.

3.1.2 | The sole institution in the healthcare system involved in detecting ASD

The public health nursing service plays a unique role in the Israeli healthcare system, as the fact that the MCHCs are the sole institution involved in ASD detection demonstrates.

> Our advantage at the MCHCs is that we see the general development of the child. We need nurses to be professionally trained as long as we are the sole institution in the healthcare system involved in detecting ASD. We still need the doctors in the primary clinics in order to refer children to specialists. But the nurses can guide the doctors at the general clinics and say, "I've seen a child with A, B, C." (D6, policy maker)

> This is one of the places where the nurse is most independent. Her operational space should be highly professional because she works in a highly diverse space and she is often alone there. (D34, policy maker)

PHNs in these facilities deal with a wide range of issues related to the health of women, children and the family. They work independently and make professional decisions on their own. Therefore, they are required to meet particularly high standards.

3.2 | Meso-level Strategies

3.2.1 | Actualising the PHNs' professional potential

Nurses in the public health service vary in their professional capabilities and the professional service they provide, which are often based on their personal capacities. This theme describes the utilisation of the nurses' professional capabilities in three areas:

Professional capabilities

Despite the lack of policy regarding professional training in ASD diagnosis, nurses often take the initiative to develop their professional capabilities independently, adding to their professional skills. Since ASD screening is a dynamic field, the nurses must constantly be aware of new information and tools they can use to develop their professional expertise and identify disorders that might previously have eluded them.

> It was my own personal search for the information. Reading articles. Looking for age-appropriate behaviors. Red flags. I have the caregiving, medical intuition to recognize a child who is not developing properly. (D10, nurse in an FG)

These proactive nurses undertake continuing education in the field on their own without relying on the organisations in which they work.

In contrast, paediatricians do not consider themselves competent enough to diagnose toddlers with developmental delays for two reasons. First, in the primary healthcare clinics, they are overburdened with acute, sometimes life-threatening illnesses. Therefore, the diagnosis of child development issues is less urgent. Second, such issues are outside the scope of their duties in these clinics. For example, one paediatrician described his areas of expertise compared to those of the PHNs:

> In the format in which we work, you're simply in a madhouse during work ... you can't think ... you don't want to miss meningitis or myocarditis, life or death issues, and say, let's see if the child is developing properly ... no. We therefore trust those we need to trust who examine the child at the MCHCs. (D20, a paediatrician in an FG)

Specific screening for ASD identification

> If we can institutionalize the use of the M-CHAT in the MCHCs, we will have a better chance of identifying children with ASD. (D9, institutional director at the Ministry of Health)

Making specific screening for ASD routine for PHNs will increase the number of identified individuals and help to bridge the gap in ASD identification.

> I teach the nurses how to use the M-CHAT/F, how to observe children and notice things that had previously gone unnoticed. In global developmental screening, there is a lack; you can't examine the shared attention, the shared pleasure in a game or whether the child is interested in his or her peers. (D12, nurse in an FG)

Specific ASD screening involves observations of the child from perspectives not available in the framework of global developmental screening. Nurses who become proficient in the use of ASD screening tools improve their diagnostic abilities and can help teach other nurses how to use them as well.

Specialised ASD nurses in the community

Specialisation at the community level is part of the role of PHNs who specialise in ASD. They must make connections with other institutions in the community in order to promote their area of specialisation.

> A multitude of positions means that not all nurses do everything or the same things. Some of them have subspecialties and are allocated to other centers that deal with specific issues, such as child development. This is how we take a specific service and allocate people to provide it. (D34, policy maker)

Subspecialisation in public health nursing requires the nurse to be involved with the community institutions and centres that make diagnoses and provide treatments.

> Most toddlers from the Bedouin community are cared for by their mothers. If a mother doesn't know, then she doesn't know. But if a mother doesn't know and her child is at a daycare center, then either the mother sees that her child is different from others or the daycare center caregiver draws the parents' attention to it. In these cases, more focus should be placed on diagnosing these children at the MCHC because there is no other organization that does that. (D2, policy maker)

Thus, when parents cannot identify their child's problem and the child is not in the education system, the healthcare system must deal with the issue. PHNs should support families in the community and provide them with guidance and resources.

A specialised nurse in the community who comes from the Bedouin population can identify children with suspected ASD and follow up on the diagnostic process.

> Collaboration with a public health nurse who belongs to the Bedouin community, speaks the language, and is familiar with the culture is crucial for the autism issue. The nurses support the families and take part in the diagnostic process. These nurses bring a

different perspective to the diagnostic process in case of a dispute regarding the diagnosis. It's truly multi-professional work. (D9, institutional director in the healthcare system)

Specialist nurses from within the community accompany the family from the identification stage to the diagnostic stage and until the child is placed in a suitable framework. Their understanding of the culture helps prevent misdiagnoses and improves the chances of making an accurate diagnosis. They are also capable of conveying medical information to the family in a manner that accords with their cultural norms.

3.2.2 | Case management

The low reported incidence of ASD in the Bedouin community probably stems from the lack of accessible services in physical and cultural terms.

> The lost, neglected children who are strangers to the system should be reached at home. (D4, policy maker)

The healthcare system treats Bedouin children like strangers. As long as they are not treated equally, they will continue to be invisible to the healthcare system and be lost in the bureaucracy.

> It has to be someone who specializes in this process. He's a case manager, he's related to various sources from within the community, and he promotes the process. (D34, policy maker)

Part of the professional expertise of the PHNs involves providing treatment to families who need it. Their knowledge about and access to various resources in the community helps promote treatment and minimises the bureaucracy involved in obtaining it.

3.3 | Micro-level strategies

3.3.1 | The population's compliance

The Bedouin towns and villages that do offer healthcare and MCHCs are more likely to have communities that are willing to use these services and comply with their recommendations.

> I see it as a general trend that can also be found in the Bedouin community. Even now, more people come to the MCHCs. Even if, let's say, they don't get to the child development center, the MCHC often does notice the child's developmental issues and alerts the family. (D1, policy maker)

Due to the harsh living and environmental conditions of the Bedouin, those receiving treatment cannot always get to appointments outside their towns or villages. Therefore, the MCHCs play a key role in promoting children's health.

3.4 | Correlations between the themes

We found correlations between all of the levels of the EM. At the macro-level, the theme of professional identity, values and objectives correlated with and influenced the case management theme at the meso-level. At the meso-level, the theme of actualising the nurses' professional potential correlated with and influenced the theme of the population's compliance at the micro-level.

4 | DISCUSSION

Using the EM, we revealed strategies at three levels that helped to identify children with ASD in the Bedouin community in southern Israel. Our findings are also potentially useful in other low SES communities.

4.1 | The macro-level

Motivated by their values, ideology and goals, PHNs seek to identify anomalies in children and refer them to HMO paediatricians for treatment. They regard themselves as providing protection and assistance to their patients, with whom they are well acquainted. They want to help the disadvantaged, let their voices be heard and support and supervise them throughout the processes of diagnosis and treatment.

The legally mandated provision of preventive services to the entire child population is unique to Israel and the MCHC is the only such service whose goal is to identify children on the autistic spectrum. These centres are equipped with tools that help to reduce the gaps that exist between ethnic low SES communities and other communities in identifying ASD children.

4.2 | The meso-level

At this level, we determined that the PHNs have strong professional capabilities that stem from their basic training. They work independently and deal with a wide range of topics related to toddlers and parenting. Many of the nurses keep their skills up to date through continuing education provided by their organisations or through initiatives that they undertake independently. These findings are consistent with those of Carr, Watt-Watson, McGillion, and Huizinga (2016) and the innovative model of Greenhalgh, Robert, Macfarlane, Bate, and Kyriakidou (2004), which identifies the factors that encourage the innovations of individuals in organisations.

The innovations range across a continuum from distribution (formal, central and planned innovation) to diffusion (non-formal, decentralised and unplanned innovation). The successful diffusion and application of the innovation model require that those who might adopt it to imitate the innovative behaviour. Furthermore, the dissemination of information improves when specialist nurses serve as experts because their use of various strategies helps to disseminate information (Kaasalainen et al., 2012).

The M-CHAT/F screening tool is also instrumental in instilling knowledge about ASD and providing specific skills to identify it. This tool allows practitioners to observe children from standpoints that are lacking in the global developmental screening currently used in the MCHCs. Its use also develops nurses' professional senses and diagnostic capacity. Faldt, Nordlund, Holmqvist, Lucas, and Fabian (2019) found that nurses who used a screening tool felt that their professional capabilities had increased along with their awareness of ASD. The professional development of nurses contributes to, enhances and promotes their ability to better respond to parents' questions about child development. It strengthens the relationships between parents and caregivers and eases their communication on issues such as parental concerns over children's development (Johansen et al., 2016).

This screening tool is in use in MCHC in southern Israel including the Bedouin population. A study conducted by the team in screening by M-CHAT found that: Of the 3,343 toddlers who were screened with the M-CHAT/F instrument, 109 (3.3%) screened positive, with slightly higher rates for Jewish toddlers, although the difference was not statistically significant (3.9% vs. 3.0% respectively; $p = 0.165$). Of the 109 toddlers who were referred for further developmental assessment at SUMC, 88 (80.7%) started the diagnosis process and 59 of these (67%) completed it during the time course of the study. While there were no ethnic differences in the rates of toddlers who started the diagnosis process (82.1% vs. 80.0% for Jewish and Bedouin toddlers respectively; $p = 0.795$), only 57.1% of the Bedouin toddlers completed the diagnosis process during the course of this study compared to 84.4% of the Jewish toddlers ($p = 0.001$) (Kerub et al., 2021). In this study, ASD prevalence in the Jewish population was three times higher than that in the Bedouin population.

Experts within the community can help deal with children with suspected ASD through synergetic work with staff from various disciplines (Martyn, Martin, Gutknecht, & Faleer, 2013). In order to narrow gaps in diagnosis, specialist nurses should identify those communities in which early diagnosis (Melnyk, Gallagher-Ford, Long, & Fineout-Overholt, 2014) is imperative. Given that the burdens of the paediatric physicians in the primary care clinics do not allow them to perform ongoing follow-ups after the children's referrals, children may not receive prompt access to diagnosis and treatment (Liptak et al., 2008). Allocating responsibility for the administration of treatment to a specialist nurse who is familiar with the community may narrow gaps in early diagnosis. This approach can also reduce inequality in healthcare, contribute to nurses' professional development, increase their professional prestige and attract potential nurses, who are in short supply.

Thus, the specialist nurse plays a critical role in performing early screening for ASD and referring children to experts in the community healthcare system (Nadel & Poss, 2007). Once children have been identified, specialist nurses offer resources and support to parents and families. Following diagnosis, they continue to provide comprehensive healthcare services to children and their families and create links between the various medical experts and complementary and alternative service providers who treat children with ASD.

4.3 | The micro-level

The population's compliance with the services of the PHNs at the MCHCs should be leveraged to develop parental knowledge about and awareness of ASD. Bedouin families comply very willing with these services. As mentioned above, approximately 97% of all babies born in Israel are treated at the MCHCs (Ministry of Health, Southern Health District & Israel Center for Disease Control, 2008), a figure that reflects their use by the Bedouins population as well. The unique model of the MCHCs and the training of their medical staffs can also provide a response to the wide range of needs of other weak and ethnically diverse populations in Israel.

In a study conducted by Kerub et al., it was demonstrated that when screening for ASD was performed, by experienced nurses familiar with Bedouin culture and language, the proportion of children found positive by screening in the Jewish and Bedouin populations were similar. However, Jewish toddlers were more likely to complete the diagnostic process. That is, more Bedouin children were lost to follow up during the diagnostic process (Kerub et al., 2021(.

5 | LIMITATIONS

Since not all of our research participants were from the Bedouin community, participants' responses might not be representative of the Bedouin population. Future studies should also use in-depth interviews with parents to provide an additional perspective on developing strategies for the service-oriented model.

6 | CONCLUSIONS

This study explored strategies for identifying and diagnosing children with ASD in the Bedouin community. The findings reveal multilevel strategies that help to identify and diagnose ASD. In order to reduce the gaps between ethnic and other populations in terms of the diagnosis of autism, it is necessary to identify and change the policy factors that influence access to services for children with ASD at every ecological environment level in the Bedouin community and to incorporate PHNs from the Bedouin community in future services. The development of culturally appropriate policies, screening and interventions is required to serve the needs of Bedouin children and their families.

CONFLICT OF INTERESTS

There is no competing interests.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. : American Psychiatric Association.

Baio, J., Wiggins, L., Christensen, D. L., Maenner, M. J., Daniels, J., Warren, Z., Kurzius-Spencer, M., Zahorodny, W., Robinson, C. R., White, T., Durkin, M. S., Imm, P., Nikolaou, L., Yeargin-Allsopp, M., Lee, L.-C., Harrington, R., Lopez, M., Fitzgerald, R. T., ... Dowling, N. F. (2018). Prevalence of autism spectrum disorder among children aged 8 years autism and developmental disabilities monitoring network, 11 sites, United States, 2014. *MMWR Surveillance Summaries*, *67*(6), 1–23. https://doi.org/10.15585/mmwr.ss6706a1

Begeer, S., Bouk, S. E., Boussaid, W., Terwogt, M. M., & Koot, H. M. (2009). Underdiagnosis and referral bias of autism in ethnic minorities. *Journal of Autism and Developmental Disorders*, *39*(1), 142–148. https://doi.org/10.1007/s10803-008-0611-5

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Bronfenbrenner, U. (1989). *Ecological systems theory: Annals of child development*: Harvard University Press. https://doi.org/10.1037/0003-066X.

Bronfenbrenner, U. (1992). *Ecological systems theory*: Jessica Kingsley Publishers.

Carr, E. C., Watt-Watson, J., McGillion, M., & Huizinga, A. (2016). The quest of pain education leaders in Canada and the United States: A qualitative study. *Journal of Advanced Nursing*, *72*(11), 2728–2737. https://doi.org/10.1111/jan.13050

Davidovitch, M., Hemo, B., Manning-Courtney, P., & Fombonne, E. (2013). Prevalence and incidence of autism spectrum disorder in an Israeli population. *Journal of Autism and Developmental Disorders*, *43*(4), 785–793. https://doi.org/10.1007/s10803-012-1611-z

Evans, C., & Lewis, J. (2018). *Analysing semi-structured interviews using thematic analysis: Exploring voluntary civic participation among adults*. : SAGE Publications Limited.

Faldt, A., Nordlund, H., Holmqvist, U., Lucas, S., & Fabian, H. (2019). Nurses' experiences of screening for communication difficulties at 18 months of age. *Acta Paediatrica (Oslo, Norway: 1992)*, *108*(4), 662–669. https://doi.org/10.1111/apa.14557

Golden, S. D., McLeroy, K. R., Green, L. W., Earp, J. A. L., & Lieberman, L. D. (2015). Upending the social ecological model to guide health promotion efforts toward policy and environmental change. *Health Education and Behavior*, *42*(1_suppl), 8S–14S. https://doi.org/10.1177/1090198115575098

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *The Milbank Quarterly*, *82*(4), 581–629. https://doi.org/10.1111/j.0887-378X.2004.00325.x

Greenwood-Hickman, M. A., Renz, A., & Rosenberg, D. E. (2015). Motivators and barriers to reducing sedentary behavior among overweight and obese older adults. *The Gerontologist*, *56*(4), 660–668. https://doi.org/10.1093/geront/gnu163

Hagan, J. F., Shaw, J. S., & Duncan, P. M. (2007). *Bright futures: Guidelines for health supervision of infants, children, and adolescents*. : American Academy of Pediatrics.

Central Bureau of Statistics. (2019). Total population. Statistical abstract of Israel (2019). NO.70. https://www.cbs.gov.il/en/publications/Pages/2019/Population-Statistical-Abstract-of-Israel-2019-No-70.aspx

Johansen, K., Lucas, S., Bokstrom, P., Persson, K., Sonnander, K., Magnusson, M., & Sarkadi, A. (2016). 'Now I use words like asymmetry and unstable': Nurses' experiences in using a standardized assessment for motor performance within routine child health care. *Journal of Evaluation in Clinical Practice*, *22*(2), 227–234. https://doi.org/10.1111/jep.12459

Kaasalainen, S., Brazil, K., Akhtar-Danesh, N., Coker, E., Ploeg, J., Donald, F., Martin-Misener, R., DiCenso, A., Hadjistavropoulos, T., Dolovich, L., & Papaioannou, A. (2012). The evaluation of an interdisciplinary pain protocol in long term care. *Journal of the American Medical Directors Association*, *13*(7), 664.e1–664.e8. https://doi.org/10.1016/j.jamda.2012.05.013

Kerub, O., Haas, E. J., Meiri, G., Bilenko, N., Flusser, H., Michaelovski, A., Dinstein, I., Davidovitch, N., & Menashe, I. (2021). Ethnic disparities in the diagnosis of autism in Southern Israel. *Autism Research*, *14*(1), 193–201. https://doi.org/10.1002/aur.2421

Kerub, O., Haas, E. J., Meiri, G., Davidovitch, N., & Menashe, I. (2018). A comparison between two screening approaches for ASD among toddlers in Israel. *Journal of Autism and Developmental Disorders*, *50*, 1553–1560. https://doi.org/10.1007/s10803-018-3711-x

Kerub, O., Haas, E., Menashe, I., Davidovitch, N., & Meiri, G. (2018). Autism spectrum disorder: Evolution of disorder definition, risk factors and demographic characteristics in Israel. *The Israel Medical Association Journal*, *20*(9), 576.

Kogan, M. D., Vladutiu, C. J., Schieve, L. A., Ghandour, R. M., Blumberg, S. J., Zablotsky, B., Perrin, J. M., Shattuck, P., Kuhlthau, K. A., Harwood, R. L., & Lu, M. C. (2018). The prevalence of parent-reported autism spectrum disorder among US children. *Pediatrics*, *142*(6), e20174161. https://doi.org/10.1542/peds.2017-4161

Krueger, R. A. (2014). *Focus groups: A practical guide for applied research*. Sage Publications.

Leonard, H., Dixon, G., Whitehouse, A. J. O., Bourke, J., Aiberti, K., Nassar, N., Bower, C., & Glasson, E. J. (2010). Unpacking the complex nature of the autism epidemic. *Research in Autism Spectrum Disorders*, *4*(4), 548–554. https://doi.org/10.1016/j.rasd.2010.01.003

Liptak, G. S., Benzoni, L. B., Mruzek, D. W., Nolan, K. W., Thingvoll, M. A., Wade, C. M., & Fryer, G. E. (2008). Disparities in diagnosis and access to health services for children with autism: Data from the national survey of children's health. *Journal of Developmental and Behavioral Pediatrics*, *29*(3), 152–160. https://doi.org/10.1097/DBP.0b013e318165c7a0

Lundström, S., Reichenberg, A., Anckarsäter, H., Lichtenstein, P., & Gillberg, C. (2015). Autism phenotype versus registered diagnosis in Swedish children: Prevalence trends over 10 years in general population samples. *British Medical Journal*, *350*. https://doi.org/10.1136/bmj.h1961

Martyn, K. K., Martin, J., Gutknecht, S. M., & Faleer, H. E. (2013). The pediatric nurse practitioner workforce: Meeting the health care needs of children. *Journal of Pediatric Health Care*, *27*(5), 400–405. https://doi.org/10.1016/j.pedhc.2013.03.005

Matson, J. L., Worley, J. A., Fodstad, J. C., Chung, K.-M., Suh, D., Jhin, H. K., Ben-Itzchak, E., Zachor, D. A., & Furniss, F. (2011). A multinational study examining the cross cultural differences in reported symptoms of autism spectrum disorders: Israel, South Korea, the United Kingdom, and the United States of America. *Research in Autism Spectrum Disorders*, *5*(4), 1598–1604. https://doi.org/10.1016/j.rasd.2011.03.007

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education*

Quarterly, *15*(4), 351–377. https://doi.org/10.1177/1090198188 01500401

Meiri, G., Dinstein, I., Michaelowski, A., Flusser, H., Ilan, M., Faroy, M., Bar-Sinai, A., Manelis, L., Stolowicz, D., Yosef, L. L., Davidovitch, N., Golan, H., Arbelle, S., & Menashe, I. (2017). Brief report: The Negev Hospital-University-Based (HUB) autism database. *Journal of Autism and Developmental Disorders*, *47*(9), 2918–2926. https://doi.org/10.1007/s10803-017-3207-0

Melnyk, B. M., Gallagher-Ford, L., Long, L. E., & Fineout-Overholt, E. (2014). The establishment of evidence-based practice competencies for practicing registered nurses and advanced practice nurses in real-world clinical settings: Proficiencies to improve healthcare quality, reliability, patient outcomes, and costs. *Worldviews on Evidence-Based Nursing*, *11*(1), 5–15. https://doi.org/10.1111/wvn.12021

Ministry of Health, Southern Health District and Israel Center for Disease Control. (2008). The health status of bedouin babies and children up to 6 years old in recognized localities and unrecognized localities. (In Hebrew). https://www.health.gov.il/PublicationsFiles/ICDC_314.pdf

Mohamed, F. E., Zaky, E. A., Youssef, A., Elhossiny, R., Zahra, S., Khalaf, R., Youssef, W., Wafiq, A., Ibrahim, R., Abd-Elhakim, R., Obada, A., & Eldin, W. S. (2016). Screening of egyptian toddlers for autism spectrum disorder using an Arabic validated version of M-CHAT; report of a community-based study (stage I). *European Psychiatry: The Journal of the Association of European Psychiatrists*, *34*, 43–48. https://doi.org/10.1016/j.eurpsy.2016.01.2421

Nadel, S., & Poss, J. E. (2007). Early detection of autism spectrum disorders: Screening between 12 and 24 months of age. *Journal of the American Academy of Nurse Practitioners*, *19*(8), 408–417. https://doi.org/10.1111/j.1745-7599.2007.00244.x

Nassar-McMillan, S. C., & Borders, L. D. (2002). Use of focus groups in survey item development. *The Qualitative Report*, *7*(1), 1–12.

Nygren, G., Sandberg, E., Gillstedt, F., Ekeroth, G., Arvidsson, T., & Gillberg, C. (2012). A new screening programme for autism in a general population of Swedish toddlers. *Research in Developmental Disabilities*, *33*(4), 1200–1210. https://doi.org/10.1016/j.ridd.2012.02.018

Raz, R., Weisskopf, M. G., Davidovitch, M., Pinto, O., & Levine, H. (2015). Differences in autism spectrum disorders incidence by sub-populations in Israel 1992–2009: A total population study. *Journal of Autism and Developmental Disorders*, *45*(4), 1062–1069. https://doi.org/10.1007/s10803-014-2262-z

Rea, K. E., Armstrong-Brine, M., Ramirez, L., & Stancin, T. (2019). Ethnic disparities in autism spectrum disorder screening and referral: Implications for pediatric practice. *Journal of Developmental and Behavioral Pediatrics*, *40*(7), 493–500. https://doi.org/10.1097/DBP.0000000000000691

Robins, D. L., Casagrande, K., Barton, M., Chen, C. M., Dumont-Mathieu, T., & Fein, D. (2014). Validation of the modified checklist for autism in toddlers, revised with follow-up (M-CHAT-R/F). *Pediatrics*, *133*(1), 37–45. https://doi.org/10.1542/peds.2013-1813

Saligheh, M., McNamara, B., & Rooney, R. (2016). Perceived barriers and enablers of physical activity in postpartum women: A qualitative approach. *BMC Pregnancy and Childbirth*, *16*(1), 131. https://doi.org/10.1186/s12884-016-0908-x

Samadi, S. A., & McConkey, R. (2015). Screening for autism in Iranian preschoolers: Contrasting M-CHAT and a scale developed in Iran. *Journal of Autism and Developmental Disorders*, *45*(9), 2908–2916. https://doi.org/10.1007/s10803-015-2454-1

Taylor, B., Jick, H., & MacLaughlin, D. (2013). Prevalence and incidence rates of autism in the UK: Time trend from 2004–2010 in children aged 8 years. *British Medical Journal Open*, *3*(10), e003219.

Wiggins, L. D., Durkin, M., Esler, A., Lee, L.-C., Zahorodny, W., Rice, C., Yeargin-Allsopp, M., Dowling, N. F., Hall-Lande, J., Morrier, M. J., Christensen, D., Shenouda, J., & Baio, J. (2019). Disparities in documented diagnoses of autism spectrum disorder based on demographic, individual, and service factors. *Autism Research*, *13*, 464–473. https://doi.org/10.1002/aur.2255

Zablotsky, B., Black, L. I., Maenner, M. J., Schieve, L. A., Danielson, M. L., Bitsko, R. H., Blumberg, S. J., Kogan, M. D., & Boyle, C. A. (2019). Prevalence and trends of developmental disabilities among children in the United States: 2009–2017. *Pediatrics*, *144*(4), e20190811. https://doi.org/10.1542/peds.2019-0811

Zuckerman, K. E., Lindly, O. J., Reyes, N. M., Chavez, A. E., Macias, K., Smith, K. N., & Reynolds, A. (2017). Disparities in diagnosis and treatment of autism in latino and non-latino white families. *Pediatrics*, *139*(5), e20163010. https://doi.org/10.1542/peds.2016-3010