

Health literacy in Israel – from measurement to intervention: Two case studies

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Abstract. This report focuses on opportunities, challenges and outcomes of health literacy related interventions in Israel, based on health literacy measurement. The importance of a system's and community approaches are discussed, as is cultural appropriateness. Two case studies are highlighted - the first on childhood immunization and the second on self-management of chronic health situations. In the second example, a combination of community, media, digital, and face-to-face interventions comprise a broad approach to intervention. The impact and some findings are presented, including conclusions derived from each initiative.

Keywords: Health literacy, immunization, digital health literacy, vaccination, diabetes, chronic care, universal healthcare, health promotion

1. Introduction

Health literacy is directly related to both healthcare and public health and is operationally defined as: “the development of the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health” [1].

The basic principles upon which health literacy is based have long been issues of concern in both patient care and public health within Israel's health system. As a country whose population is comprised of a cultural mosaic, the issue of cultural appropriateness and competence have been deeply rooted in health literacy interventions. In order to provide universal healthcare (which was sanctioned by the National Health Insurance Law of 1994), there is wide access to community, primary health care services. The latter provides a plethora of opportunities for local health literacy interventions. Finally, as Israel has, in the past decade, been coined a ‘Start-up Nation’, digital health currently is at the forefront of health system innovation, which fosters the need to assess and promote digital health literacy, while ensuring existing health disparities are not exacerbated [2].

The initial health literacy research in Israel was underpinned by the Hebrew Health Literacy Test, which validated the S-TOEFL for local use [3]. The Media Health Literacy (MHL) model and test also was

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developed and validated among adolescents in Israel and predicted health risk behaviors and identified populations at risk for low MHL [4].

In addition, the Israel National Health Literacy Survey, based on the HLS-Euro Survey, suggested the country's population was 'likely sufficient' (69%). In contrast, the projected national problematic and inadequate health literacy was more than 30%. The association of health literacy with other social determinants of health - suggested by the Survey's findings - enabled comparisons with other countries in Europe and Asia, as well as the association of health literacy with Israel's quality of life [5,6]. Additional analysis of the data suggests individual locus-of control is associated with health literacy in Israel [7]. Concurrently, the scope of e-health literacy was assessed in Israel and validated compared to broader population health literacy [8].

Israel also has partnered with international stakeholders for strategic projects, such as the Diabetes Literacy Project supported by the European Commission, and the Health Literacy of Children and Adolescents (HLCA) project from Germany [9,10] and others. Israel is a member of the Measuring Population and Organizational of Health Literacy network (M-POHL) of the WHO Euro Region working towards a new national survey. In addition to research findings derived from population measures of health literacy, and action to promote policy, mainly embedded in the health system. Israel's other related activities include a range of interventions. In this report, the authors discuss the impact of health literacy interventions in Israel's public health and healthcare systems via two case studies. One case study assesses vaccine hesitancy and the other is a range of initiatives to promote type 2 diabetes patient self-management.

2. Case study 1: Promoting childhood vaccination

2.1. Health literacy, vaccination, and vaccination hesitancy

Health literacy is generally associated with better health and health promoting behaviors, such as cancer screening, healthy eating, and other behaviors [11–14]. Several studies suggest individuals with higher levels of health literacy also tend to have higher levels of vaccination coverage for themselves as well as their children [15].

More recently, however, the prevalence of pockets of Israeli parents that do not completely accept recommended vaccination schedules is on the rise, otherwise known as 'vaccine hesitancy'. 'Vaccine hesitancy' is operationally defined as a situation in which parents decide to partially vaccinate their children. Parents may decide to permit their child to receive a portion of the recommended vaccines, while rejecting others, delay the age of a child's immunization, or may even categorically refuse to participate. In addition, parents may comply with the entire recommended list of vaccinations, while expressing concern regarding immunization safety [16].

Ultimately, vaccine hesitancy increases the prevalence of diseases preventable by vaccinations, such as measles. This phenomenon warrants an increased need to understand why parents decide to diverge from medical recommendations and protocols [17]. From a public policy perspective, the maintenance of high levels of vaccine coverage (in Israel and globally) is necessary to avert a decline in herd immunity, which in turn prevents a reoccurrence of diseases that otherwise might be on the verge of extinction.

While many studies have associated factors such as individual knowledge, beliefs, and attitudes with vaccine compliance, these do not comprehensively explain the rise and persistence of vaccine hesitancy. The public decision-making regarding the uptake of vaccination is not straightforward, and the information needed to make informed decisions is complex. The comprehension of the illness and the vaccine

requires functional literacy and numeracy skills as well as interactive and critical health literacy and evaluation capabilities to seek accurate information, including the appropriate use of digital sources. The quantity of available health information (especially on the internet) increases the need for critical and evaluation health literacy skills, which potentially can challenge or promote more evidence-based vaccination decisions.

Thus, health literacy could be one of the underlying variables that influences vaccine hesitancy, which correspondingly suggests the need for more in-depth study and analysis. In a systematic review, Lorini et.al. identified nine studies that assessed the relationships between vaccine hesitancy and health literacy [15]. All the studies identified were fairly recent (2008–2017), most were conducted in the U.S. (six), with only one study performed in a low-income country. Eight out of the nine studies were cross sectional, and only one was a prospective study. The studies assessed populations from different age groups and for various types of vaccines.

Most importantly, the studies' findings varied considerably. Some studies found a positive association between health literacy and vaccination, others found no association and some found a negative association. Despite this inconsistency, Lorini et al. concluded "the relationship between health literacy and vaccinations seems to be driven by risk perceptions and by the likelihood of getting sick or suffering from complications in the short term. When these possibilities are high, health literacy positively predicts vaccination uptake; when they are low, health literacy negatively predicts vaccination uptake or shows no effect [15]".

2.2. *A study of infant vaccination and health literacy in Israel*

The authors' Israel study may serve as a case study of parents' decision-making regarding vaccination of young children within a developed country with a well established healthcare system, high life expectancy, and a highly educated population [16]. In an aforementioned study, the authors showed that in Israel, general health literacy is high compared to other European countries, as 69% were found to have 'likely sufficient' health literacy [5]. Yet, health literacy in Israel is not significantly associated with the majority of desired health behaviors. Some of the results suggested Israelis with high levels of health literacy do not always choose to adopt behaviors that enhance better health or are consistent with the publicized goals of public health interventions, the reasons for which are not completely clear.

Regarding the infrastructure for childhood vaccination, Israel has a developed system of community Mother and Child Health Clinics (MCHC). More than 95% of infants are registered at these clinics, accessibility to vaccination is higher than in some nations.

The authors' study was a stratified case-control study with a retrospective cohort. Participants were recruited from a sampling framework of infants born in 2009 and registered at the MCHCs, and were divided into two groups. The first group included children whose parents had not completed at least one of three childhood vaccinations by the age of two, including: hepatitis B vaccination (HBV-3), diphtheria-tetanus, pertussis (DTaP-4), and vaccinations against mumps, measles and rubella (MMP-1). The second group was a control group that had received all these vaccines as recommended by age two.

Each group was randomly sampled and a telephone interview was conducted. In total, the authors interviewed 422 parents whose infants were not fully vaccinated and 309 parents whose infants were fully vaccinated. A questionnaire was developed that assessed health literacy based on a diabetes health literacy measure which was adapted to measure vaccine health literacy [18]. The measure included functional,

communicative, and critical health literacy, which represent the three types of health literacy defined by Nutbeam [19]. In addition, the questionnaire included measures of participant knowledge, beliefs, and attitudes towards vaccinations and demographic characteristics.

The authors used path analysis to test a theoretical model. Overall, parents in the group that did not fully vaccinate their children were more likely to have a higher level of education and a higher income. While there was no difference in functional health literacy between the two groups of parents, communicative and critical health literacy were higher among parents in the group that did not fully vaccinate their children.

In the path analysis (taking into account all the variables associated with vaccinating the children) two pathways could be identified. The findings showed a direct pathway between communicative health literacy and vaccinations, and an indirect pathway between functional and critical health literacy. Several mediating variables were identified, such as attitudes and the perceived reliability of informal sources regarding vaccines. For example, parents who did not comply with recommended childhood vaccinations tended to search for additional information on the internet and to base their decisions on informal online sources.

It is possible that a high degree of functional health literacy provided Israeli parents with more access to multiple health information sources, which eclipsed the basic information that is often accessed. Furthermore, expanded access may also have fostered more exposure to the information opposing vaccinations, which could have influenced parental attitudes - and lead to a reduced compliance with the vaccination protocol.

Similarly, Meppelink et al. suggest that people with higher levels of health literacy are more prone to confirmation bias when looking for information on the internet [20]. Confirmation bias also suggests people who search for information on the internet will confirm their beliefs and attitudes and are less open to new ideas.

Although prior literature suggests critical health literacy is the most sophisticated level of health literacy, it is additionally possible that Israeli parents (with higher levels of critical health literacy) actively sought information about vaccinations and then, deliberately refrained from complying with a vaccination protocol [21]. A consequence of having a health-literate public is that some of the population may display vaccine hesitancy and decide not to vaccinate their children - based on a perceived capability to make health decisions autonomously, albeit contrary to medical recommendations.

Overall, the authors did not find a positive association between knowledge and vaccinations, which suggests among the participants, information seeking was not associated with compliance with vaccine recommendations. In fact, lower parental abilities to seek, understand and be critical about health information prompted higher levels of adherence to recommended vaccinations for infants.

Although improved health literacy may not have a similar effect on health behaviours among all populations, ages, and socio-economic levels, the findings call for further research to understand the exact pathway in which health literacy impacts behaviours. The findings additionally suggest the need to assess the degree health literacy is associated with numeracy, or the specific ability to distinguish the evidence base of medical recommendations.

In addition, the study suggests high health literacy may not automatically foster public health compliance as people may tend to lose trust in medical recommendations and believe they can make their own health decisions, while simultaneously misunderstanding the validity of evidence-based health information.

2.3. Practical implications for applied intervention

The implications of the latter study are important, as Israel, like many other Western countries, was recently challenged with a measles outbreak. In 2018, measles outbreaks occurred in areas where specific communities had not vaccinated their children, mainly due to either religious beliefs or, alternatively, as a result of vaccination opposition that permeated social media in secular, high socio-economic-status areas [22]. Intensive, culturally appropriate health education and promotion efforts were launched by Israel's Ministry of Health (MoH) in partnership with religious leaders, the HMOs/primary health care system, and medical professional organizations and the mass media. While the MoH declared the measles outbreak 'under control' weeks after the outbreak began, in the process, Israel's healthcare system became increasingly aware of the significance of reliable and appropriate sources of health information, as perceived by the public [23].

3. Case study 2: Promoting self-management among people with chronic disease

3.1. Background – The scope of chronic disease in Israel

As in most Organization for Economic Co-operation and Development (OECD) countries, the prevalence of chronic disease in Israel is increasing, mainly due to rapid changes in lifestyles, and an increasingly aging population. Of greatest concern is type 2 diabetes, which occurs among 9% of Israeli adults over the age of 18. Type 2 diabetes is higher among the Israeli Arab community and among adults from the Ethiopian immigrant community [24]. The aforementioned Israel National Health Literacy Survey suggests the lower the health literacy, the higher the prevalence of chronic disease ($p < 0.0001$). Hence, improving health literacy is a consideration in chronic disease prevention and health policy efforts, as is promoting empowerment for individual self-management [5].

3.2. Intervention methods

The findings of a European study on Diabetes Literacy - in which Israel participated through Clalit Health Services (Israel's largest, public non-profit,) - suggested group, individual counselling, on-line, and peer counselling interventions could be effective for diabetes self-management (DSME) [25]. In turn, the latter study's conclusions fostered efforts to provide new diabetes self-management programs/interventions within diverse Israeli population settings. The following discussion introduces some recently implemented diabetes self-management interventions in Israel on a national and/or local or experimental basis. Since the research is in progress, only a few intervention outcome measures are provided. The programs within a large type 2 diabetes self-management initiative include: individual counseling/coaching; group workshops facilitated by interdisciplinary teams; peer education; digital information prescriptions; and tailored text messages.

3.2.1. Individual Counselling/Coaching – C.H.A.N.G.E.-D. (*Coaching for Health and New Goals for Empowerment*)

Individual coaching and counseling are among several other promising methods to promote healthy lifestyles and self-care practices among people with type 2 diabetes. An intervention model to empower

individuals through health literacy and health behavior change was developed by Clalit and implemented in Arab and Jewish communities in the north of Israel.

The objective was to assess an innovative communication program that promoted changes in lifestyle, enhanced medication adherence, improved communication with care providers and ultimately better health outcomes. The study's population, a representative sample of 502 Jewish and Arab adults with uncontrolled type 2 diabetes), was recruited from the primary care registry of Clalit. Fifteen health professionals were selected and trained in health coaching. They provided 20 face-to-face and telephone coaching sessions for individuals and spouses/significant others. The primary conclusion from the feasibility study was that the introduction of a health-promoting coach within a multiplicity of DSME methods offers promise to encourage people with chronic conditions to adopt health promoting behaviors.

3.2.2. *Group workshops facilitated by inter-disciplinary team*

Israel's Ministry of Health has provided incentives for diabetes health promoting interventions for primary health care services since 2012. Patients with diabetes are invited to a six to eight weekly session workshops in which they receive instructions from an inter-disciplinary team composed of physicians, nurses, dieticians, health promoters, physical education coach/physiotherapists, and social workers/psychologists. Workshops are available in Hebrew, Arabic, Russian and Amaharic. Several thousand people annually participate in the program.

The initial evaluation data from Clalit Health Services suggests participation in the workshop is significantly associated with improved diabetes self-management and significantly improved glycemic control among the participants.

3.2.3. *Peer education*

Peer education and support, are seen as effective strategies to enhance self-management among people with chronic conditions and more specifically for adults with diabetes [26,27]. The peer participation approach enables communication among the participants in equal terms and the sharing of valuable experience gained from everyday practice, promoting empowerment and a sense of belonging to a common community.

A prototype, peer led program for people with diabetes was developed, piloted, and evaluated in the city of Ashdod in Israel. A 12-session program for peer leaders was developed by a multi-disciplinary health team along with a group of people with diabetes, followed by intense peer training and implementation among small groups of people with diabetes from Clalit's primary community clinics. Each group was facilitated by two peer leaders with diabetes, with supervision offered by a health behaviour specialist. The pilot included sessions on emotional coping with diabetes, nutrition, physical activity, self-care practices, organizing medication, communication with the health care team and accessing sources of information.

The findings from qualitative research methods suggested overall high satisfaction from participants in addition to a significantly improved sense of empowerment. The peer leaders additionally reported very high motivation to continue to contribute to the program months after the end of the pilot period.

3.2.4. *Digital information prescriptions*

Information therapy/prescriptions accessed digitally is an additional way in which health literacy is attracting the attention of health care management organizations, as digital health is becoming more widely recognized strategically and gradually implemented. National strategies in digital health, such as that of

the NHS in the UK, have distinctly noted that digital technology has the potential to transform the way patients engage with services, improve the efficiency and co-ordination of care, and support people in managing their health and wellbeing [28]. Information prescriptions is not a new topic, as well over a decade ago, studies were conducted and published in the scientific literature [29]. A recent study in the US showed the association of information therapy referrals by physicians and reduction in hospitalizations, emergency room visits and high satisfaction by patient users, based on an incentive based model [30].

Information prescriptions for people with newly diagnosed diabetes also have been developed by Clalit, and automatically sent to the person being treated by e-mail. The information prescriptions contain information about self-care, informative and motivational videos, and modeling with regard to navigating the health care delivery system. In developing the special initiative, formative evaluation was conducted among providers as well as among people with diabetes. Thousands of people with diabetes have already access this system and the planning of evaluation to assess the acceptability of the initiative and its contribution to patient self-management is underway.

3.2.5. Text messages based on the transtheoretical model for change

Text messages have been used to influence a variety of health behaviors related to diabetes [31–33], acknowledging that disparities still exist with regard to access to mobile health (mHealth) interventions [34]. Integrating text messages for people with diabetes, as an intrinsic part of their primary health care was seen by Clalit and colleagues as a promising strategy to advance self-management. Thus, Clalit partnered with *Otzma*, a non-governmental voluntary health organization, to develop and test a text message tool to promote healthy lifestyle and self-care among people with diabetes.

An original bank of 150 clear language messages was developed in Hebrew, based on the Trans-theoretical Model for Behavior Change [35]. For each of the stages of change in the model, brief motivational messages were developed for the following topics: nutrition, physical activity, smoking cessation, adherence to medication, medical follow-up, and footcare. Following a needs evaluation for each participant, messages were sent daily in the first stage of the three month intervention period, and every other day for the next three months. The intervention group ($n = 50$) was compared to a control group ($n = 30$), regarding health outcomes. The findings suggest the change in HbA1C measure for glycemic control was significantly better ($p = 0.05$) within the intervention compared to the control group.

4. Conclusions and lessons learned

The two case studies demonstrate the importance of assessing health literacy as a strategy to address population health needs. While the impact of increased health literacy differs between the two case studies, each suggests there are important associations between population health literacy and health outcomes. In both cases, health literacy needs were taken into consideration to plan health education and health promotion interventions - acting locally and planning nationally. As evidenced in the case study to promote self-management among people with diabetes, diverse interventions are needed to address the complexity of the Israeli population and their health challenges. Regarding the digital interventions, digital health literacy is an important skill to enable people to take best advantage of the digital resource. As digital health literacy has been shown to be contextual, depending upon the individual's personal, social, situational and environmental context [36], likewise interventions need to be tailored to people's needs, as seen both case studies. The results of the latter studies and initiatives described will form a basis upon which a national

action plan for Israel on health literacy will be developed, under the auspices of the National Council on Health Promotion of the Israel Ministry of Health. Overall, the lessons learned from Israel's current health literacy interventions hopefully will be helpful to decision-makers, practitioners, and researchers from around the globe, who seek to meet similar challenges in the public health and healthcare arenas.

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