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Health literacy in selected populations: Individuals, families, and communities from the international and cultural perspective

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Abstract. International and cultural perspectives of health literacy help deepen the understanding of the global context within which health literacy plays an important role. Throughout this article, we explore the significance of health literacy initiatives, interventions, practices, and research for addressing health challenges on a variety of levels in the international and global context. More specifically, the notion of health literacy as a dynamic construct is introduced, after which we examine health literacy throughout the life course, emphasizing the impact of health literacy among children and the elderly in their families and in the community. Cultural norms and family interpersonal relations, and values influence health literacy and need to be considered when closing the health literacy disparities. Global trends of migration and immigration bring to the forefront the need for unravelling the complexity of health systems, for which health literacy plays a central role; health literacy initiatives address cultural differences between providers and patients to help narrow the communication gap. The importance of cultural competency among health care providers exemplifies how capacity building in health literacy is critical for maximizing the benefits to the public of the health care system. Health literacy provides a conceptual foundation for community participatory research, involving members of the public to take part in the planning, execution and evaluation of health education interventions. Selected case studies and picture boxes from around the globe, exemplify aforementioned topics of interest. Practical recommendations for policy makers, practitioners and research are offered based on the studies conducted in the international context.

Keywords: Health literacy, cultural competency, patient-provider communication, digital health literacy, media health literacy

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1. Introduction

This article will focus on the health literacy of individuals and families, then expand to discuss interpersonal considerations and cultural issues including those relating to transition and change. Much valuable work has been undertaken in the US to explore these complex issues. This article aims to widen the lens and examine the global and intercultural aspects of health literacy across a broad range of countries and settings. The intention is not to provide a summary of research being conducted globally, but rather to examine the global body of research for broad theoretical, methodological and practice trends and implications. More specifically we intend to show how health literacy initiatives, interventions, practices, research or perspectives impact or address specific public health issues through the more specific sections of the article. Following this introduction, section two demonstrates how health literacy is a conceptually dynamic construct. We then continue on to show in the third section how health literacy can be developed across the life course and the impact this might have upon health outcomes for children, adults, families, and communities. The fourth section focuses on how health literacy initiatives contribute to addressing differences in cultural norms, family interpersonal relations, and family values. The fifth section follows to show how health literacy initiatives and efforts contribute to addressing ongoing challenges from immigration and migration patterns. The sixth section addresses the role of health literacy initiatives helping to bridge gaps when conflict arises between traditional and Western cultural beliefs. The seventh section exemplifies how health literacy initiatives focusing on cultural competence impact issues associated with provider-patient relations. The eighth section covers how health literacy provides a conceptual foundation for community based participatory research. In the ninth section we offer recommendations for practitioners, researchers, and policy makers for new directions in health literacy research, theory, and practice and providing some suggested areas for applied health literacy research and exploration. Finally, in the last section we summarize the article's overall conclusions. We finish by drawing together all these elements to identify some key messages including implications for future health literacy research.

We will identify selected US research and service development initiatives with resonance for health literacy research in other national, cultural and linguistic settings, while also identifying where some of the global health literacy work could inspire and inform research in the US.

Throughout the article we illustrate our points with 'vignettes' from different settings across the globe.

2. Health literacy is a dynamic construct

While concrete definitions of health literacy exist, in this section, we emphasize the importance of understanding that health literacy is a dynamic construct. Individual health literacy is the cumulative outcome of a combination of cognitive capacities, life experiences, knowledge, and opportunities. For families and communities, it arises from shared history and experiences (particularly in relation to health), the pooled health literacy of individual members, and societal influences. Health literacy thus is constantly evolving and changing. Importantly for both individuals and groups, health behaviors and engagement with health services reflect the balance between individual or group skills and ability, and the demands and complexities of societal systems. As those demands change, so must the skills and abilities of individuals, families and communities if the same health outcomes are to be achieved, as shown in Fig. 1 [46].

Fig. 1. Reproduced from: Parker R. Measuring health literacy: What? So what? Now what? In: Hernandez L., editor. Measures of health literacy: workshop summary, Roundtable on Health Literacy. Washington, DC: National Academies Press; 2009, p. 91–98 [46].

Fig. 2. Reproduced from Health literacy. The solid facts. Copenhagen: WHO Regional Office for Europe, 2013 [58].

2.1. The multiple stakeholders in health literacy

There are multiple stakeholders in health literacy, as shown in Fig. 2 [58]. Health literacy thus is influenced by the demands and complexities of health systems, as well as social systems, workplaces, the environment, and the corporate world, particularly food and drink producers and markets.

Health literacy is key to not only health, but to human development at a population level, and to realising human potential. This is exemplified by how health literacy is integral to the Sustainable Development Goals (SDGs), particularly goal number three: "Ensure healthy lives and promote well-being for all at all ages" and goal number four: "Ensure inclusive and equitable quality education and promote

life-long learning opportunities for all" [54]. For example, improved health literacy may be achieved through efforts to advance the goal to achieve universal primary education. Similarly, improved health literacy and increased community participation in health and healthcare, in parallel with developments to improve health systems and widening access to Health Care (Universal Coverage or UC) [55], represent a key to achieve a reduction in child mortality, improve maternal health, and combat infectious diseases such as HIV/AIDS, and malaria. For additional discussion of health literacy and the SDGs see Rowlands et al. [50].

This article will examine both elements in the 'Health Literacy Equation' shown in Fig. 1.

3. The impact of health literacy across the life course – from childhood to adulthood

In this section we will focus on how health literacy can influence health outcomes for children, adults, families, and communities.

3.1. Health literacy's impact on children and adolescents

Efforts to enhance a child's health literacy, especially functional health literacy (sufficient basic skills in reading and writing to function effectively in everyday health situations) are significantly associated with improvements in basic literacy and numeracy skills [44]. Health literacy initiatives also address (or seek to counter) enduring social determinants of health (SDH); and enable children, teens, and future adults to 'achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society' [10,32].

The WHO links health literacy initiatives to improved global literacy, which is one of the organization's international sustainable development goals [54]. The WHO adds language, literacy, and numeracy (LLN), represent a trio of desirable sustainable development goals, which in turn foster self-development [44]. Overall, the development of critical health literacy skills promotes the participation of young persons in external activities, and cultivates their abilities to extract information and derive meaning from different forms of communication, which augments cognitive adaptation [44].

The WHO also hypothesizes that building LLN skills and health literacy in childhood and adolescence effectively provides the tools teens need to make informed decisions about lifestyle and sexual health. The U.S. Centers for Disease Control and Prevention (CDC) recognizes the need to cultivate health literacy based decision making tools, and has a collection of online resources for parents, educators, and child health professionals [10].

An example of an innovative health literacy initiative is the Bigger Picture Campaign, a youth-led diabetes prevention social media campaign co-created by the University of California, San Francisco with participating area adolescents in 2013 (http://thebiggerpicture.org/). Using social media, are adolescents were encouraged to speak to peers regarding how teen lifestyle norms (such as a high ingestion of sugar) is linked to obesity and diabetes. Such health literacy training uses a preferred mode of mass communication among the intervention's intended audience and involves teen stakeholders appropriately to self-represent the social and environmental factors that impact their health.

While there is a dearth of research about how improved literacy impacts future decision making, a measure for Media Health Literacy has been developed [32]. Also, a recent Canadian study found school children developed a better awareness of 'hidden', often health-damaging messages in popular advertising following media-health literacy training [1]. Moreover, the development of health literacy and ensuing literacy and decision-making skills among children and adolescents represent a ripe area

for future research, especially regarding the effectiveness and impact of health literacy interventions on teen health and lifestyle decisions. Lifestyle decisions made in adolescence influence both current and future health, and there is evidence that lifestyle choices adopted in adolescence persist into later life [7,53].

3.2. The importance of developing health literacy skills in adults

Health literacy skills can also be developed in adults. The UK Skilled for Health Program, which delivered health literacy skills training to individuals and community/workplace groups, showed an increase in health knowledge (diet, exercise, smoking, and alcohol intake, and mental health). Lifestyle behaviors became healthier in the areas of diet, exercise, and mental health. In addition, participants described more confidence in interactive health literacy skills [44], particularly in discussing their health with health professionals, and also skills in navigating the, often complex, UK health system [12]. The program has since been replicated in Canada [16].

In Australia, evaluation of a community education program for adults with low basic skills, developed from the Skilled for Health program, showed improvements in participants' health literacy skills and confidence, positive student and teacher engagement with course content and self-reported improvements in health knowledge, attitudes, and communication with healthcare professionals [41].

In summary, there is a need for research to assist in identifying which skills and knowledge are needed to more effectively engage with health and healthcare and cope better when health issues arise (e.g. navigation related skills, communication and problem solving skills) – and when and how we develop these capacities in people. In addition, a better understanding is needed as to how to support people when health issues arise, to develop the condition specific skills and knowledge needed to effectively manage their health.

3.3. The impact of developing health literacy skills in families for promoting health

In developed countries, nuclear families are usually the social context within which people live. Families tend to be small (one or two parents with or without children), and often have little social networks and support. Low parental health literacy can result in unhealthy lifestyles and poorer health. In the UK, family health literacy initiatives have shown potential benefit for participants, although evaluations have been small and no large trials have been undertaken.

In both developing and developed settings, health decisions are often not made by individuals – often decisions are made collectively, often by parents or families. Culturally there are significant differences in relation to how decisions are made, but there are equally differences within cultures. Depending on the particular issue, the family and the culture, a decision might be made by an individual (about their own health or that of another family member – for example, a husband making a decision on behalf of his wife) or individuals might come together to discuss and make collective decisions. In some recent research undertaken in Pakistan, male heads of household are usually responsible for making any health related decisions that have financial implications [49].

This complexity brings to light the question of 'whose health literacy' is the most important and relevant to actions? In the case of Pakistan, there might be a very health literate wife, but if her husband is the one making the decisions, it is his health literacy that ultimately influences how she engages with health actions and services.

Health literacy programs have been noted to impact not only health decisions, but also family relations. The HEY! (Healthy Eating for Young Children) is an early childhood health improvement program

"HEY! has changed my eating habits. My key worker got me on HEY! and it helped it coming just before Christmas so I could make a fresh start, a new year's resolution. We still have some treats but we feel much better in ourselves"

Ashley had recently moved to Leicestershire with her husband and two small children and felt isolated away from family and friends. She was introduced to the HEY! course – as well as a parenting group – at the children's center near where she lives. Ashley says HEY! made her really examine what she ate and make a lot of changes such as reducing sugar and salt – not easy as she works in a fast food café with burgers and fizzy drinks freely available. *"Before HEY! I used to have three or four coffees a day and three or four Red Bulls and full sugar Cokes. Now I have one coffee three times a week and water with sugar free squash. At work I have cup-a-soups and savoury crackers and bottled water – not burgers and chips. I'm not bloated now and have lost two stone"*.

Ashley explains that she eats less and more slowly since HEY! and knows when she's full. Her husband does most of the cooking and has changed to making healthier – and smaller – meals following HEY! Ashley has started to do more cooking and now buys less ready-made and processed food. *"We make wraps now using 50/50 bread as we like Mexican food. We cook chicken breasts and haddock fillet and add vegetables and seasoning – then you know what's in it"*.

Not only has Ashley moved to healthier options for food and drinks and started cooking more, she and her family have changed their eating habits, which has brought them closer together. A big change was buying a dining table and chairs so they could eat together in the kitchen instead of on their laps in the living room, which means their toddler doesn't play with his food or wander off any more. *"We have breakfast with the kids now – and enjoy each other's company"*. This led to cooking for special occasions – like Christmas and the Chinese New Year, which their toddler was learning about at pre-school. *"It's better for our marriage – doing things* together. We've done a Valentine's Day meal and Pancake Day for the first time in 3 years".

Ashley has learnt that healthy eating helps mental as well as physical health and sees eating as part of a healthy lifestyle. She's made other changes to her lifestyle including reducing her hours at work to shorter shifts and feels much better for it. *"I'm sleeping much better now – there's less stress but it's the diet as well – less coffee and so on"*.
"The last 6 months of 2014 – with HEY! and the parenting course – have made a massive impact on me today"

Box 1. A Picture from the UK.

which aims to improve the health literacy of parents who attend. The focus of the health education program is healthy eating within the framework of a healthy lifestyle. The course aims to improve parents' ability to make more informed and healthier choices for themselves and their toddlers [11]. Anecdotal evidence from participants on the impact of the intervention is striking. One participant describes the health benefits from healthier eating; she also describes improving family cohesion (Box 1).

Another family health learning initiative from the UK was the Healthy Families, Health Literacy Project. This was developed by an education team with family learning education expertise. It aimed to empower parents living is a socio-economically deprived area of London to improve their functional, interactive and critical health literacy. The learning topics were chosen by the parents and included

understanding food labels, dealing with food allergies, and exercising as a family. The course included practical sessions to develop and share food recipes, cook together, and walk together. Participants found the course stimulating and exciting, with a direct and healthy impact on 'the way they lived their lives'. Participants developed functional and interactive health literacy skills [35].

4. Health literacy initiatives address the differences in interpersonal communication, family values, community and cultural norms

In this section, we explore cultural influences and emphasize the role of health literacy in the interpersonal, family, and wider community contexts. When exploring the relationship between interpersonal communication and health literacy, both with regard to cultures in transition and more established cultures, a dilemma emerges regarding which approach to health literacy should be taken – the functional one or the more complex one. This differentiation has been described by Martensson [37], characterizing the more polarized approach focusing on the extremes of high and low literacy, as opposed to the complex approach acknowledging that health literacy represents a broadness of skills that includes interaction in the social and cultural context. This approach acknowledges that the individual's health literacy may fluctuate with context and is also dynamic, changing with time and with changing circumstance. In this regard, an individual may be considered health literate in one culture or context, while not in another. Furthermore, this more complex approach includes interactive and critical health literacy in addition to functional health literacy to facilitate taking health decisions, an approach which is important for the individual and society.

Two specific aspects of interpersonal relationships and health literacy are of particular significance – that of the relationships within families in the context of culture change, as well as health literacy as a vehicle for promoting social capital in disadvantaged groups

4.1. Family relationships, communication and health literacy in the cultural context

Cultural norms influence the way in which families communicate with regard to health. Cultures in transition, either due to geographic migration or to societal trends dictating a move from more traditional to Western paradigms, present families with challenges regarding the discourse of health and well-being within the family. Firstly, if in the more traditional model the extended family played a significant role in the individual's health and well-being, the more Western model emphasizes the dominance of the nuclear family [48]. This transition has not only narrowed the base for support, in many cases it changed the role of family members, particularly with regard to gender. Furthermore, it created challenges regarding the formerly accepted role of the younger and older generations, often creating conflict between generations. An example of this situation is described in the word picture from Malawi (Box 2). Malawi's story shows the challenges in promoting health literacy in light of societal contexts prohibiting individual empowerment.

The ramifications for health literacy are quite significant as exemplified in situations such as reproductive health, where in the traditional paradigm, discourse is forbidden and taboo. While the younger generation in an acculturating family may be embracing the behavioral norms of the more liberal mainstream, with respect to sexual norms, they often still lack access to health information and support from the family. The health outcomes are marked, including the younger generation's need to cope with sensitive health issues such as unplanned pregnancy and even a high rate of abortions [47]. Difficulties in initiating and maintaining discourse in families related to conditions with high levels of stigma such

The case of young people living with HIV

Tiwonde is a 19-year old girl who lives with her aunt since her parents died of AIDS when she was three years old. She was born with HIV, but she found out that she is HIV-positive when she was 13 years old. Before that, she was taking medication without knowing why, but with time, she has come to understand that as long as she takes her medication, she can be healthy. But life is not easy for someone with HIV because there is a lot of fear and stigma and discrimination! Tiwonde often finds it difficult to take her medication because her aunt's husband and children do not know that she is HIV-positive. They fear that her aunt's husband will throw her out of the house if he finds out so she has to hide her medication very well and she takes care that no one sees her taking her medication. She goes to a boarding school where she is having problems with attending classes when she has to go for check-ups and to collect her medication. Tiwonde has been nicknamed "the sick one" because she always gives random excuses for going to the hospital. Like at home, she hides her medication, and she unintentionally misses to take her medication when she fails to find an opportunity to take it without onlookers. There is a boy a little older than her who has been showing interest in dating her, but she is afraid to start a relationship because she does not know how to tell him she is HIV-positive, and that he will abandon her and tell people at school about her status. Moreover, her aunt has told her that she can only be together with someone who is also HIV-positive. She has tried to talk to doctors and nurses about relationship issues, but they have shouted at her and accused her of wanting to spread the virus. She has heard rumors about a pastor who cures HIV through prayer, and she has been thinking about going to see him. Her aunt once took her to a village doctor who gave her some herbs, but they never worked. She wants to meet other young people living with HIV but is afraid that people will find out about her status if she joins a support group.

Box 2. A Picture from Malawi.

as mental illness or to communicable diseases such as HIV, are often exacerbated in the context of the stress of culture changes such as acculturation.

It should be noted that family acculturation is a dynamic process, with different levels of acculturation. This process supports the previous mentioned definition of health literacy as a complex phenomenon that changes with changing and variable contexts [14].

4.2. Health literacy as a vehicle for promoting social capital in disadvantaged groups

There is evidence showing that, in a diversified society, the more disadvantaged groups tend to use more online sources of health information than the mainstream population, compensating for the lack of social capital that supports more health promoting health information [39]. According to this hypothesis, it would be expected that people from cultures in transition, when families play less of a role as sources of useful health information than in the past, might be using more online tools, particularly in their native languages. If so, this phenomenon may change the assumption about the Digital Divide, however more research is needed to explore this avenue of study.

As critical as interpersonal relations in the family are with regard to health and health literacy, especially in a culturally transitional context, research is still lacking, regarding the role families play, and the most optimal strategies for intervention. Likewise, future research could explore how family

role changes that often occur during cultural transitions influence family's collective health literacy and individual family members capacities and outcomes.

5. Health literacy initiatives address challenges due to globalization or migration

In this section, we reflect on the impact and role of health literacy in cultures and societies in light of global trends and migration.

5.1. Challenges to immigrants: The importance of health literacy in inter-culture encounters with the health system

Immigrants encounter many challenges upon their arrival to a new country, one which is communication with health authorities. Some who come from authoritarian regimes or one-party states believe, for example, that health screening is a process of scrutiny to assess suitability for remaining in the country, bringing negative attitudes towards health screening [21]. In cultures where screening for diseases is not usual practice, it may be seen as an unnecessary 'secondary issue'; immigrants from such cultures often do not believe that they should undergo health screening because they perceived themselves as healthy [21]. Some believe that they have no choice about whether or not to attend health screening; the 'invitation' may be interpreted as a 'requirement' from the authorities to all the newcomers, for the benefits of society as a whole, rather than individuals themselves [43].

In addition to such misunderstandings, more practical barriers arise, such as not arriving for health appointments due to inability to read the invitation letter, not understanding the reason for invitation, and not knowing when and where the health screening would take place [21]. Such language barriers negatively affect communication between immigrants and health care professionals, reducing the accuracy and willingness of symptoms reporting [3]. Such difficulties cannot always be resolved by the presence of interpreters; often, immigrants' political or psychosocial reasons hinder the communication [21]. Cultural beliefs about an illness and health care is another determining factor influencing people's participation in health screening tests. For example, how comfortable one feels to discuss their body with a physician (physical modesty), whether one visits a physician only when there is a presenting symptom, such as pain (crisis intervention approach) or alternatively for regular symptom-free visits, as would be the case for one to seek Eastern medicine. In a study of American Korean men [26], their cultural beliefs about cancer were found to significantly determine their recent uptake of prostate cancer screening tests. The men who used crisis intervention were less likely to seek cancer screening than those who used preventive approach; those who preferred to use Eastern medicine for health care were more likely to seek for prostate cancer screening. The use of Eastern medicine may indicate that these immigrants misunderstand and/or mistrust Westernized health care and medicine, reducing their engagement and participation in treatment [33]. This is evidence that cultural beliefs play a part in health screening decisions.

Culturally influenced preventive behaviors vary across different age groups. The older American Koreans (aged 70 or more) that preferred to use Eastern medicine were more likely to take cancer screening tests; however, the younger American Koreans (aged 50 to 60) were less likely to undergo health screening tests in spite of the fact that they also preferred to use Eastern medicine. Another immigrant group, Chinese Americans, demonstrated similar behavior. This finding suggests that in addition to culture, age also influences health screening and preventive behaviors [26].

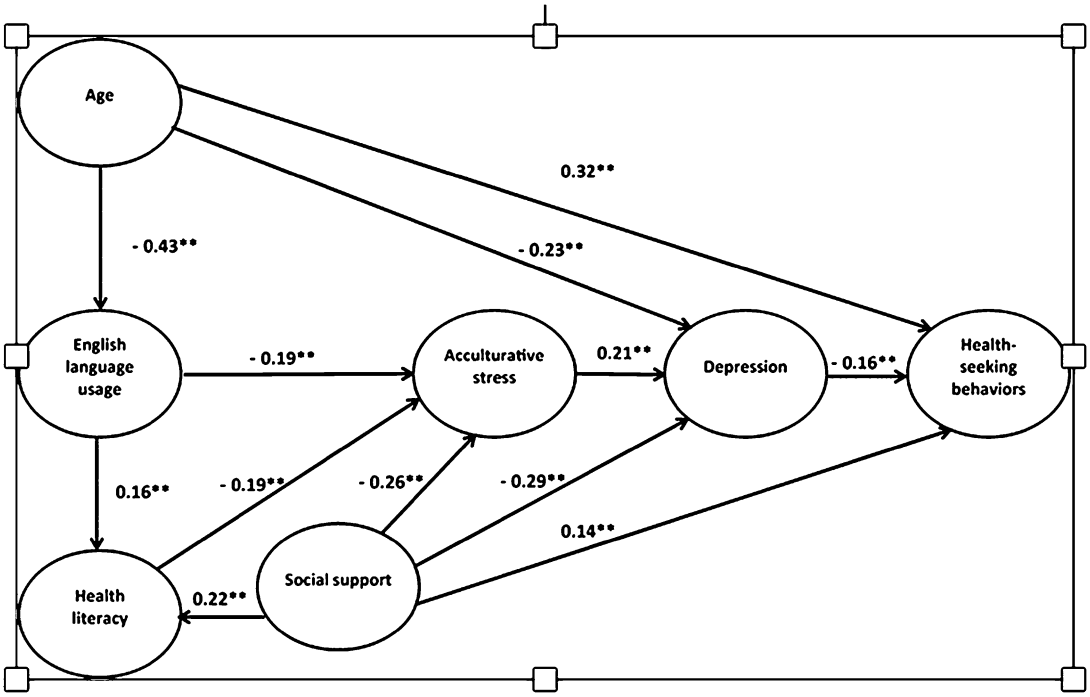

Figure 3. Reproduced from Maneze et al., 2016 [36].

5.2. *Health literacy as a protective factor for acculturation challenges*

Migration in later life can be a stressful event; for example for older Chinese Australian immigrants, migration is associated with depression and anxiety due to language difficulty, knowledge and literacy, and the change of role and status within the family and society [15]. Loss of job, loss of physical health and loss of friends in the original country, and the changed roles in families, can produce feelings of hopeless and can lead to depression. Because mental health has stigma in many societies, some immigrants refuse to admit the clinical manifestations of anxiety or depression, and have limited knowledge about mental health symptoms and services (poor mental health literacy) [36]. As an example, acculturative stress – the stresses experienced due to migration to a country or a place in which people encounter practices that are significantly different from their own cultural practices or practices in their home countries – and depression was experienced by Filipino migrants when they migrated to Australia [36]. Acculturative stress negatively affected health-seeking behavior, with depression as a major modifying factor [15]. Health literacy and social support could be the protective factors to acculturative stress, as depicted in Fig. 3. For those migrants with higher health literacy or higher level of social support, they were more likely to have less acculturative stress [36]. In Maneze and team's study, reverse relationships (i.e. from acculturative stress to health literacy or to social support) were not tested. More effective and culturally appropriate health system responses could help migrants overcome the stress of migration and perhaps prevent resulting health challenges.

Further research is needed to understand the complex inter-relationships between culture, language, social support and networks, use of health services, and mental and physical health. This can then lead to the development of effective interventions, culturally appropriate and based in communities, to better promote health and effective use of health services in immigrant populations. Because of the wide variety

of different cultures, such interventions should be tailored to, and developed in partnership with, the communities they are designed to support. In addition, future research on the global level is needed to explore the possibility of universal stressors and challenges related to migration, that services should be mindful and responsive to, what are the culture influences, and what might be anticipated as different challenges experienced on the individual level.

6. Health literacy initiatives address enduring conflicts between traditional vs western cultural beliefs

In this section, we demonstrate how health literacy places an important role in the bridge between traditional cultures meet Western culture.

6.1. Traditional vs. western cultures: Dissimilarities in health decision making

Cultural values and practices affect health behaviors and health decisions. Many cultures are hierarchical in nature, with health practitioners having elevated, respected positions. For example, Chinese people will often refrain from asking health practitioners questions, believing that asking questions is impolite as it is perceived as "challenging doctors and nurses" or "putting burden on these professionals" [29]. A similar phenomenon was observed in many Chinese societies including Hong Kong, Taiwan and Chinese communities in Los Angeles, USA [29]. Cultural preferences and lack of understanding of Western medicine can lead to delays in the diagnosis of important health conditions. Estacion found that South Asian men with diabetes in UK preferred to seek the help of a religious leader/community leader, or ignore symptoms for an extended duration before referring to formal Western health services in UK [56]. Future research can help to better understand what drives these observed practices and preferences and how interventions might be developed to support health decision making in the contexts of cultures in transition. More research should be carried out to explore the impact of culture on health decision making and health behaviors. The American Diabetes Association advocates actions to be taken to address health disparities and develop structured interventions that are tailored to ethnic populations' culture, language, religion and literacy skills [8].

6.2. Cultural change between generations: coping with cultural changes in society

Immigration results in generational effects, with different levels of acculturalization in different generations. First-generation immigrants are less likely to report disability, as compared to the third generation [45]. Yet no significant difference in disability reporting was found between the second- and the third-plus generations. Among the first-generation immigrants in Canada, those who had not immigrated from Europe or the US were less likely to report disability than their counterparts. This is likely to be partly related to the use of language. Health literacy was found to be significantly negatively associated with disability reporting only of the first-generation immigrants. This may be due to the low functional health literacy among first-generation immigrants, while better education, employment and higher income in the new country, providing paths for the second- and third-plus generations to develop better health literacy competencies for accessing and navigating the health system [45]. Some programs have even targeted young immigrants, as a means to improve access to care for entire migrant families. Picture Boxes 3 and 4 offer real-life examples of how these concerns surface in the daily lives of immigrants, presenting challenges for improving health, even when individuals have awareness of the need for adopting health promoting behavior.

Mr. D was a Chinese immigrant in Los Angeles, serving as a cook in a Chinese restaurant. One day, while he was cooking, he looked pale, sweated tremendously and his hands were shaking. His boss noted that Mr. D was not feeling well, but Mr. D denied. His boss asked, "Are you diabetic? You look as if you are having hypoglycaemia. I had such experience as well. Go and see the doctor." Mr. D was shocked to hear this. He did have diabetes but he had never told his boss. Mr. D believed that his illness would be an excuse for his boss to fire him. As he is the breadwinner, he was desperate to keep the job and bring money home. This was his duty and he was so panicked about letting his boss know he was a diabetes. To Mr. D, family is important. He would not care about his health, but he cares about whether he could support his family in a new place like Los Angeles.

Box 3. A Picture from the US health, even when individuals have awareness of the need for adopting health promoting behavior.

Mr. E was a Chinese old man with diabetes, living with his spouse and adult children. He had poor control in blood glucose but he admitted that he did not bother with diet control. He said, "I would not let my family know that I have diabetes. I always have dinner with my family. It is the happy moment to have meals together. Why do I bother what I eat? If I let them know that I have diabetes, they will change the recipe, and reduce sugar in cooking. That is not good. We, Shanghainese, always have sweet and sour food. This is our habit. I don't want my family members to upset their eating habit for me. I like to eat with them, and like to see they enjoy the meal. So, forget about it ... forget about changing the food!" Collective ideology is prominent in this story; Chinese people care about others rather than themselves.

Box 4. A Picture from China.

7. Health literacy initiatives affect providers-and-individuals communication

In this section, the importance of health literacy in enhancing effective communication between health providers and the people they serve will be explored.

7.1. The needs for enhancing effective interpersonal and inter-cultural communication for health literacy

A myriad of research has been conducted exploring a vast scope of needs and vantage points with regard to ways in which health literacy is influenced by, and influences the relationship between the individual and the health care provider. The continuing trends of massive migration and globalization have most recently amplified the need for this exploration more than ever.

The needs are particularly rooted in the fact that so many health care professionals have different ethnic/cultural backgrounds than their patients, many of them migrants and immigrants. Not only do communication barriers exist [2], many of the communities in cultural transition are, on the one hand, coping with life in a new and strange culture, while encountering new and unfamiliar health problems, some due to migration. Research suggests that immigrants coming from a more traditional, low-technology lifestyle adjusting to a Western culture, suffer from higher rates of chronic conditions and morbidity than previously experienced, and more prevalent even than the non-immigrant populations. Diabetes and depression are examples of the latter conditions [38]. This situation can be a source of misunderstanding between well-intentioned physicians and patients, fueling distrust, and resulting in mutual disappointment and eventually health disparities.

Migration, particularly migration to a country or region with different cultural beliefs and societal structures, is highly stressful, often leading to migrant health decline [24]. Generally migrants arrive in host countries in better health usually, than those from the host country. Trajectory decline in self-rated health was observed in the initial four years upon arrival, and it was particularly obvious in women and minority ethnic groups. Language partially contributes to this decline, but does not solely address the aforementioned deeper issues; merely providing oral and written translation services will not solve problems that immigrants face in a new society. Often, immigrants will have deeply-held beliefs about different systems of medicine, such as acupuncture or Ayurvedic medicine, which are based on totally different philosophical beliefs about the body, mind, health and illness. Health literacy has the potential to add significantly to our understanding of this, and to help bridge the gap between the contrasting understanding of health systems.

7.2. The inter-cultural context between provider and health service consumer

Many traditional cultures view health problems in the context of whole life experience, as opposed to isolated health problems, as is often the approach adopted by Western health systems. Moreover, the holistic perception of health may not differentiate between physical, emotional and mental well-being, as is often perceived among Western health providers. The opportunity to promote health literacy through interpersonal communication, is often impeded, even when there is a common language, due to the differentiated perception of what needs to be explained and expressed by the person seeking health services. Warfa et al. [57] determined that immigrant patients often attributed one reason to an illness, while healthcare providers often provided a different explanation for the same illness.

The health service professional often has never had specific training nor has been provided with tools to tackle the abovementioned issues, that are as basic as understanding health data with regard to ethnicity [22,38]. In particular, very few academic curricula include training future providers about migrant health decline. More research needs to be conducted regarding the role that the healthcare provider can play in slowing or preventing the inevitability of health decline due to the stress, the adjustment, and the lack of concordance of existing services and systems between culture beliefs, norm and language.

7.3. Interpersonal, community and cultural influences and health literacy skills – supportive action

Cultural competency is the set of skills which enables the health care provider to function effectively within the cultural context of the people that he/she serves, whether on the individual, family or community levels. In this way, health literacy can either be promoted and improved or alternatively communication can be adapted to the individual according to his/her to health literacy needs [49]. For example, it is important to learn of the cultural perception of chronic disease in order to best communicate on chronic disease prevention, early detection or self-care. In many traditional societies the concept of a chronic/asymptomatic health problem does not exist. Rather, the individual may expect the healthcare provider to solve the cause of the problem and thus to remove it at its root. This gap in expectation can be bridged through promotion of cultural competence among the health professionals to learn of ways in which their patients understand and conceptualize health, and thus to adapt the communication [47]. Likewise, culturally sensitive interventions can be carried out that helps immigrants understand the context within which the health system can be accessed including appointment making, receiving treatment and other points of contact with the health care system.

Areas that should be addressed in health literacy and cultural competence training include involving community stakeholders for training, to help reflect upon the needs of the individuals and families that

they treat [34]. Evaluation of the impact of such training could include patient satisfaction with encounters with health professionals. Since health literacy can be viewed as the balance between the capacities of patients and the demands and complexities of the health system [46] (see Fig. 1), such an intervention should result in improved health literacy.

Shim [52] has expanded the concept of cultural competence to "cultural health capital" defined as the "repertoire of cultural skills, verbal and nonverbal competencies, attitudes and behaviors, and interactional styles, cultivated by patients and clinicians alike, that, when deployed, may result in more optimal health care relationships". The concept is framed within the discourse of unequitable care, due to health disparities. Such cultural health capital thus moves from physician understanding of cultural issues to two-way patient: physician partnerships. It can be hypothesized that the benefits to be expected from such interventions would be even more effective than the simpler cultural competence interventions at improving patient satisfaction, improving health literacy, and improving patient outcomes. Involving patients and families in service planning, implementation and evaluation, and adjusting the services to meet the needs of the individual, should increase critical health literacy skills i.e. 'more advanced cognitive skills which, together with social skills, can be applied to critically analyze information and to use this information to exert greater control over life events and situations' [44].

The use of cultural liaisons in primary care has proven successful [31] and as exemplified in Box 5. Rather than perpetuating a system of disconnect stemming from cultural gaps, bringing a cultural liaison (a member the cultural community being served) into the health care team helps communicate with the provider, on behalf of the person receiving care. In addition, the liaisons help narrow the gap between patients/families and health providers by communicating and instructing the individual with regard to the treatment recommended, using culturally appropriate tools. Incorporating cultural liaisons in the community health care team helps to promote interactive health literacy, and to develop and reinforce skills

Asmara and his six children and their families moved from Ethiopia to Israel 10 years ago. He came expecting to encounter the perfect health support system. Feeling tired all the time, he sought help from the local community clinic. He quickly realized that the health providers not only speak a different language, and not his language, but they also arrange the way they treat people very differently from what he knew in Ethiopia. When he approached the family doctor in the community clinic, he was first sent to have a blood test, on a completely different day, and still received no treatment. He was expected to return to the physician to receive the results, however this time he understood from neighbors that he was to make an appointment through the telephone or even an online system, which he knew was beyond his capacity. He finally decided to go back to the clinic and just wait until the doctor could see him. He sat in the waiting room for a very long while and watched how other people who arrived after he did, were able to see the doctor before him. He finally decided to go home. Concurrently, the clinic office had been trying to reach him by phone to make an appointment, as his test results reflected why he was feeling so exhausted.

A week later Asmara heard from his neighbors that a new program began in the community clinic, called "Refuah Shlema". Casia, a specially trained health liaison and cultural mediator greets Asmara each time he comes to the clinic and seeks to understand what Asmara is feeling and helps communicate this to the clinic staff. She also helps to interpret the recommendations, in culturally appropriate terms, and sits with Asmara to explain to him more in depth his condition, one that he never heard about in Ethiopia – diabetes.

Box 5. A Picture from Israel.

that support the individual's independence in expressing his or her need to the health care providers, and thus to develop a trusting relationship. The research conducted on this shows that the program positively influenced the ability of new immigrants to navigate the health system, without increasing public or individual expenditure on services. The evidence showed that in clinics where the program was not implemented, a large number of unnecessary medical tests and referrals were performed. However, in spite of the evidence, many decision makers still place the burden on immigrants to adapt themselves, after so many years living in the country, preventing the program to be expanded to all clinics serving the Ethiopian community. Policy is being established in coordination with the Israel Ministry of Health which will place this special initiative under regulation requiring all clinics serving populations in need, to employ health liaisons through cultural mediation. Box 5 offers an example of inter-cultural perceptions of health service navigation, and offers an example of how this can be identified and addressed in the primary care system.

Future research should aim to study health literacy in the cultural context. Acknowledging that health literacy is a complex phenomenon, improving health literacy, is the responsibility to be shared between society and individuals/groups. Thus, interventions aimed at improving health literacy need to be directed to the individual, families, the general population, health care professionals and policy makers to increase awareness of health literacy. This can increase their awareness of the phenomenon to change attitudes, such awareness may inspire to stakeholders to develop action items that guarantee the access to relevant, health-related information, presented in ways that promote the health of individuals and groups with various life situations and with different ethnic, educational or social background. Health care professionals should be more aware of their important role as agents for improving health literacy. Through more appropriate professional training we can shed more light on health literacy in its different facets promoting a person and family centered approach in accordance with deep-rooted cultural values.

8. Health literacy provides a conceptual foundation for community-based participatory research (CBPR)

In order to more fully understand the needs of the individuals in the community for developing better methods of communication and treatment, it is critical that the public itself be updated, aware and involved. The Participatory Action Research (PAR), or also referred to as the Community-Based Participatory Research (CBPR) model focuses on how the relationship between providers in the health care system can involve the public at large, or specific groups, in order to engage participation and full partnership in the needs assessment, planning, piloting of intervention, implementation and evaluation [20].

The development and refinement of the Vietnamese Dementia resource book is a good example of how the PAR model can be used [13]. The stakeholders (individuals with low health literacy, family members and carers) were invited to participate and co-design the contents of the resource book and give comments on the appropriateness of language level used to express content. Stakeholders are asked to read aloud the draft of the resource book and tell the designer how they interpret what was read. If the wordings are too complicated to understand, the stakeholders will provide suggestions how to revise the content [27]. Such participatory actions enhanced the acceptability of knowledge about dementia among the participants, and assisted health professionals with developing relationships with clients, family members and carers in a culturally appropriate manner.

The Sisters Together program is a US initiative that aims to encourage Afro-American women 18 years and older to maintain a healthy weight by being more physically active and eating healthy foods. It

is a project of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), part of the National Institutes of Health (NIH), through the Weight-control Information Network (WIN) [5,42]. As a community health education intervention, Sisters Together is notable for its participatory, community-based approach, and it's focus on building health and empowerment skills in communities.

A critical further area of research in this domain includes identifying ways in which to engage lay stakeholders non-formal opinion leaders, citizens and non-citizens residents to take active part in assessing needs, planning action, implementing and evaluating action and intervention in health literacy, for the benefit of more positive health outcomes.

9. Innovative opportunities for improving health literacy and for health literacy appropriate interventions

This section offers a brief overview of innovative opportunities for emerging methods for improving health literacy and for adapting the communication of the health system with people of all health literacy levels.

9.1. The contribution of health literacy to digital health services and systems

New strategies are emerging in light of the tremendous challenges mentioned for individual, families and communities rooted in cultures in transition vis-à-vis accessing empowering health information and even navigating the health system. New frontiers are being forged through eHealth, mHealth, and other health technologies. The broad range of applications include not only online information websites, but also interactive electronic records in various languages, health decision support programs, mobile health, and online communities that the individuals can access. An increasing body of knowledge is based in the dynamic research, showing how online sources of health information have and can be adapted to cultures, language and to groups with a particular status in society [25]. While there is concern regarding the "digital divide" great potential exists for promoting functional health literacy [44], interactive, and even critical health literacy. The vast potential for use of mobile phones to promote health literacy is beginning to unfold and must be seriously considered and utilized where appropriate for promoting health among individuals and in communities [50].

In spite of the assumption that digital tools are utilized mainly by younger populations, older adults are not exempt from reaping the potential benefits of digital development. Health literacy training that addresses the unique characteristics of older adults should be encouraged, as this age group can be the most disadvantaged group. For example: older adults in Hong Kong with no or minimal education have poor health outcomes, and frequently visit public health services. Initiatives were launched in Hong Kong in 2006 to develop community-dwelling older adults' skills and capacity to get reliable health information from the web [28]. Interestingly, participants of this study clearly indicated that having online searching skills did not replace the importance and preference of having face-to-face communication with health professionals and receiving health information through reading books or watching television [28]. This reinforces the notion that multiple channels would be needed to develop and support older adults' health literacy. It was worth noting that only one-third of older adults or soon-to-be adults preferred to seek health information from the Internet [30].

MHealth provides new opportunities for offering essential health information and support to the general public, however the criteria for increasing individuals' capacity to understand and interpret e-health information (e-health literacy) need to be met. Mobile apps have been developed to support patients in

the various aspects of their involvement in promoting, maintaining and improving health, such as disease prevention, medication adherence, illness management, lifestyle modification and in navigating the health care system including making appointments in health services [4,9,18,19,40,51]. The most common disease-specific apps aim to provide education on diabetes, hypertension and hepatitis [19]. Most apps are provided on both iOS and Android platform free of charge [19].

An increasing number of studies investigating the effects of digital health interventions have suggested innovative digital tools are useful. A Cochrane review, comprised of four randomized controlled trials with 182 participants, analyzed the impact of mHealth (using mobile phone messaging) on self-management of long-term illnesses (including diabetes, hypertension, and asthma) [6]. Moderate evidence suggests some benefits mobile phone messaging interventions can: increase diabetic patients' self-management capacity including self-efficacy improve hypertensive patients' rate of medication compliance; and impact the peak expiratory flow variability for asthma patients [6]. There evidence was less pronounced regarding the impact of eHealth on health service utilization, and no evidence suggested long-term effects on health outcomes and cost-effectiveness form mobile phone messaging interventions [6]. The small number of studies and the limited number of participants in this review support the need for continued research and review of the evidence on health outcomes and service utilization.

While digital tools for promoting health are readily available as mentioned above, their appropriateness, particularly for people with low health literacy should be of concern. On the one hand, there is an increasing body of knowledge that suggests online sources of health information have and can be adapted to cultures, language and to groups with a particular status in society [25]. Additionally, a recent systematic review of 74 studies, suggests five relevant areas of future inquiry include: online health related content; features of eHealth services; interventions to improve eHealth literacy; health literacy measurement tools; and online health information seeking behavior [23]. The review suggests most online health content is not well-matched to user readability levels and therefore inaccessible. The review also suggests text-to-speech apps may help people with low health literacy access important online health information, that touch screen computers are helpful when surveying health literacy levels [23]. The review added even adults with high levels of health literacy sometimes evidenced low levels of self-efficacy, which deters finding reliable online information to inform health behaviors [23]. The review included was based on studies published in English [23]. Although cultural appropriateness was not investigated, the conclusions of the review have obvious implications regarding the extent to which digital tools can currently be considered a panacea for solving health literacy challenges across cultures. The importance of continued research and reviews cannot be overstated due to the significant investment in innovative tools and their sweeping uptake by health systems.

10. Cultural norms and global and local trends in society: Recommendations for practitioners, researchers, policy makers for new directions in research, theory, and practice

Interventions aimed at improving health literacy need to be directed to the individual and to the families and those influencing the individual, the general population, health care professionals and policy makers to increase awareness of health literacy. Accordingly, the influences may vary depending upon the health problem of concern. Such awareness should result in the development of measures that promote:

– the access of culturally appropriate health-related information, presented in ways that have been developed through public participation, for use in various life situations and with different ethnic, educational or social background.
– the understanding of health literacy as an issue for the whole of society instead of a view in which the responsibilities for increasing health literacy lie solely on the individual and the health care system [17].
– the understanding on the part of health care professionals, of their importance as agents to improve health literacy by encouraging and supporting individuals, families and communities in accordance with their health literacy needs, empowering them to make and apply the most appropriate health decisions within the cultural context.
– the realization that the more appropriate and culturally sensitive health systems and health information are, the more it can be claimed that health literacy contributes to social justice.

10.1. Future areas for applied research and exploration

The answers to the following questions are essential for appropriate action and can be investigated through collaborative research:

– How can communities promote lifelong skills and knowledge building, given changing needs and circumstances and the often very contextualized nature of skills/knowledge needed for health management?
– How can health systems be prepared to effectively offer information to the right people at the appropriate opportunities in the most effective way?
– What is the best way to support community members need to develop their capacity to effectively engage/learn/adapt as their needs change over time?
– How can immigrant populations be supported to develop health literacy skills enabling and empowering them to understand the health system in their new country, understand Western medicine approaches to mind, body, health and illness, and understand the shared decision making approaches to health seen in Western medicine, where patients are seen as key stakeholders and partners in their own health?
– What is the best way to train health providers to function effectively and sensitively in a cross cultural setting? Is a generic approach more effective or is cultural specificity preferred?
– To what extent do health practitioners understand these issues from the perspective of the populations they serve, and how can they best treat their patient community in the most appropriate way?
– How can health services be structured and managed such that they are approachable, accessible, and safe for people from different cultures?
– Interpreters are often used in medical consultations with immigrants unable to speak the national language of their new home. What is the health literacy of the interpreters? How do they mediate the messages between practitioner and patient?

These are all key questions that the health literacy research, practice and policy community can help to answer; the results of such research can then lead to informed and improved practice to promote health and reduce and manage illness in immigrant populations.

11. Conclusion and summary

In this article we emphasize the role of health literacy internationally across cultures, mainly from the perspectives of individuals, families and communities. We highlighted key areas where we can build on already completed research. Importantly, we have also identified some areas of focus, for the international health literacy research community, where there is little or no research, and great potential for a health literacy approach to offer people new opportunities for promoting health. We have highlighted some areas where interventions and developments are recognized and evaluated and can be implemented and re-evaluated in other countries and settings. Finally, we have emphasized some important areas where little is known, and invite the international community to consider, develop and apply new avenues for practice, research and policy.

References

[1] D. Begoray, J. Wharf Higgins, J. Harrison and A. Collins-Emery, Adolescent reading/viewing of advertisements. Understandings from transactional and positioning theory, *J Adolesc Adult Lit.* **57**(2) (2013), 121–130. doi:10.1002/jaal.202.

[2] J.R. Betancourt and A.R. Green, Cultural competence: Healthcare disparities and political issues, in: *Immigrant Medicine*, Saunders, Elsevier, 2007.

[3] A. Bischoff, P.A. Bovier, I. Rrustemi, F. Gariazzo, A. Eytan and L. Loutan, Language barriers between nurses and asylum seekers: Their impact on symptom reporting and referral, *Soc Sci Med.* **57**(3) (2003), 503–512. doi:10.1016/S0277-9536(02)00376-3.

[4] S. Coughlin, H. Thind, B. Liu, N. Champagne, M. Jacobs and R.I. Massey, Mobile phone apps for preventing cancer through educational and behavioral interventions: State of the art and remaining challenges, *JMIR Mhealth Uhealth.* **4**(2) (2016), e69.

[5] L. Curtis, Z.G. Brown and J.E. Gill, Sisters Together: Move more, eat better: A community-based health awareness program for African-American women, *J Natl Black Nurses Assoc.* **19**(2) (2008), 59–64.

[6] T. de Jongh, I. Gurol-Urganci, V. Vodopivec-Jamsek, J. Car and R. Atun, Mobile phone messaging for facilitating self-management of long-term illnesses, *Cochrane Database Syst Rev.* (2012), 12:Cd007459.

[7] L. Degenhardt, C. O'Loughlin, W. Swift, H. Romaniuk, J. Carlin, C. Coffey et al., The persistence of adolescent binge drinking into adulthood: Findings from a 15-year prospective cohort study, *BMJ Open.* **3**(8) (2013), e003015.

[8] Diabetes care – strategies for improving care: American Diabetes Association (ADA), http://care.diabetesjournals.org/content/39/Supplement_1/S6.

[9] D.J. Dute, W.J. Bemelmans and J. Breda, Using mobile apps to promote a healthy lifestyle among adolescents and students: A review of the theoretical basis and lessons learned, *JMIR Mhealth Uhealth.* **4**(2) (2016), e39.

[10] Education and Community Support for Health Literacy: Centers for Disease Control and Prevention (CDC); Available from: http://www.cdc.gov/healthliteracy/education-support/index.html.

[11] Evaluation of the HEY! programme: A report for Danone Nutricia early life nutrition, Shared Intelligence, London, 2015.

[12] Evaluation of the second phase of the Skilled for Health Programme, The Tavistock Institute and Shared Intelligence, London, 2009.

[13] D. Goeman, J. Michael, J. King, H. Luu, C. Emmanuel and S. Koch, Partnering with consumers to develop and evaluate a Vietnamese dementia talking-book to support low health literacy: A qualitative study incorporating codesign and participatory action research, *BMJ Open.* **6**(9) (2016), e011451. doi:10.1136/bmjopen-2016-011451.

[14] V. Hackenthal, S. Spiegel, R. Lewis-Fernandez, E. Kealey, A. Salerno and M. Finnerty, Towards a cultural adaptation of family psychoeducation: Findings from three latino focus groups, *Community Ment Health J.* **49** (2013), 587–598. doi:10.1007/s10597-012-9559-1.

[15] B. Haralambous, B. Dow, A. Goh, N.A. Pachana, C. Bryant, D. LoGiudice et al., 'Depression is not an illness. It's up to you to make yourself happy': Perceptions of Chinese health professionals and community workers about older Chinese immigrants' experiences of depression and anxiety, *Australas J Ageing.* **35**(4) (2016), 249–254. doi:10.1111/ajag.12306.

[16] Health literacy: Improving health, health systems, and health policy around the world, Workshop Summary, Washington, DC, 2013.

[17] Health literacy: A prescription to end confusion. Washington DC: Institute of Medicine, 2004.

[18] K.J. Horvath, D. Alemu, T. Danh, J.V. Baker and A.W. Carrico, Creating effective mobile phone apps to optimize antiretroviral therapy adherence: Perspectives from stimulant-using HIV-positive men who have sex with men, *JMIR Mhealth Uhealth.* **4**(2) (2016), e48.

[19] J. Hsu, D. Liu, Y.M. Yu, H.T. Zhao, Z.R. Chen, J. Li et al., The top Chinese mobile health apps: A systematic investigation, *J Med Internet Res.* **18**(8) (2016), e222.
[20] B.A. Israel, A.J. Schulz, E.A. Parker and A.B. Becker, Review of community-based research: Assessing partnership approaches to improve public health, *Annu Rev Public Health.* **19** (1998), 173–202. doi:10.1146/annurev.publhealth.19.1.173.
[21] F.K. Kalengayi, A.K. Hurtig, A. Nordstrand, C. Ahlm and B.M. Ahlberg, 'It is a dilemma': Perspectives of nurse practitioners on health screening of newly arrived migrants, *Glob Health Action* **8** (2015), 27903. doi:10.3402/gha.v8.27903.
[22] N.R. Kandula, M. Kersey and N. Lurie, Assuring the health of immigrants: What the leading health indicators tell us, *Annu Rev Public Health.* **25** (2004), 357–376. doi:10.1146/annurev.publhealth.25.101802.123107.
[23] H. Kim and B. Xie, Health literacy in the eHealth era: A systematic review of the literature. *Patient Educ Couns*, 2017.
[24] I.H. Kim, C. Carrasco, C. Muntaner, K. McKenzie and S. Noh, Ethnicity and postmigration health trajectory in new immigrants to Canada, *Am J Public Health.* **103**(4) (2013), e96–e104.
[25] G.L. Kreps and L. Neuhauser, New directions in eHealth communication: Opportunities and challenges, *Patient Educ Couns* **78**(3) (2010), 329–336. doi:10.1016/j.pec.2010.01.013.
[26] H.Y. Lee and Y. Jung, Older Korean American men's prostate cancer screening behavior: The prime role of culture, *J Immigr Minor Health.* **15**(6) (2013), 1030–1037. doi:10.1007/s10903-013-9804-x.
[27] A. Leung, Older adults' involvement in the development of health literacy materials: Findings from cognitive interviews, in: *The 62nd Annual Scientific Meeting of the Gerontological Society of America*, Atlanta, USA, 2009.
[28] A. Leung, P. Ko, K.S. Chan, I. Chi and N. Chow, Searching health information via the web: Hong Kong Chinese older adults' experience, *Public Health Nurs.* **24**(2) (2007), 169–175. doi:10.1111/j.1525-1446.2007.00621.x.
[29] A.Y. Leung, A. Bo, H.Y. Hsiao, S.S. Wang and I. Chi, Health literacy issues in the care of Chinese American immigrants with diabetes: A qualitative study, *BMJ Open.* **4**(11) (2014), e005294. doi:10.1136/bmjopen-2014-005294.
[30] A.Y.M. Leung, D.Y.P. Leung and M.K.T. Cheung, Preference for online health information among Chinese, *J Health Mass Commun.* **3**(1–4) (2011), 46.
[31] D. Levin-Zamir, S. Keret, O. Yaakovson, B. Lev, C. Kay, G. Verber et al., Refuah shlema: A cross-cultural programme for promoting communication and health among Ethiopian immigrants in the primary health care setting in Israel: Evidence and lessons learned from over a decade of implementation, *Glob Health Promot.* **18**(1) (2011), 51–54. doi:10.1177/1757975910393172.
[32] D. Levin-Zamir, D. Lemish and R. Gofin, Media Health literacy (MHL): Development and measurement of the concept among adolescents, *Health Educ Res.* **26**(2) (2011), 323–335. doi:10.1093/her/cyr007.
[33] W. Liang, E. Yuan, J.S. Mandelblatt and R.J. Pasick, How do older Chinese women view health and cancer screening? Results from focus groups and implications for interventions, *Ethn Health.* **9**(3) (2004), 283–304. doi:10.1080/1355785042000250111.
[34] D. Lie, O. Carter-Pokras, B. Braun and C. Coleman, What do health literacy and cultural competence have in common? Calling for a collaborative health professional pedagogy, *J Health Commun.* **17** (2012), 13–22. doi:10.1080/10810730.2012.712625.
[35] D.A. Lie, E. Lee-Rey, A. Gomez, S. Bereknyei and C.H. Braddock, 3rd, Does cultural competency training of health professionals improve patient outcomes? A systematic review and proposed algorithm for future research, *J Gen Intern Med.* **26**(3) (2011), 317–325. doi:10.1007/s11606-010-1529-0.
[36] D. Maneze, Y. Salamonson, C. Poudel, M. DiGiacomo, B. Everett and P.M. Davidson, Health-seeking behaviors of Filipino migrants in Australia: The influence of persisting acculturative stress and depression, *J Immigr Minor Health.* **18**(4) (2016), 779–786. doi:10.1007/s10903-015-0233-x.
[37] L. Mårtensson and G. Hensing, Health literacy – a heterogeneous phenomenon: A literature review, *Scand J Caring Sci.* **26**(1) (2012), 151–160. doi:10.1111/j.1471-6712.2011.00900.x.
[38] Z. Meng, L. Molyneaux, M. McGill, X. Shen and D.K. Yue, Impact of sociodemographic and diabetes-related factors on the presence and severity of depression in immigrant Chinese Australian people with diabetes, *Clin Diabetes* **32**(4) (2014), 163–169. doi:10.1007/s10903-015-0233-x.
[39] G. Mescha, R. Manob and J. Tsamirc, Minority status and health information search: A test of the social diversification hypothesis, *Soc Sci Med.* **58**(5) (2012), 854–858. doi:10.1016/j.socscimed.2012.03.024.
[40] J. Mirkovic, D.R. Kaufman and C.M. Ruland, Supporting cancer patients in illness management: Usability evaluation of a mobile app, *JMIR Mhealth Uhealth.* **2**(2) (2014), e33.
[41] D.M. Muscat, S. Smith, H.M. Dhillon, S. Morony, E.L. Davis, K. Luxford et al., Incorporating health literacy in education for socially disadvantaged adults: An Australian feasibility study, *Int J Equity Health.* **15**(1) (2016), 84. doi:10.1186/s12939-016-0373-1.
[42] National eHealth Strategy Toolkit. Geneva: WHO and the International Telecommunications Union; 2012.
[43] F.K. Nkulu Kalengayi, A.K. Hurtig, A. Nordstrand, C. Ahlm and B.M. Ahlberg, Perspectives and experiences of new migrants on health screening in Sweden, *BMC Health Serv Res.* **16** (2016), 14. doi:10.1186/s12913-015-1218-0.

[44] D. Nutbeam, Health literacy as a public health goal: A challenge for contemporary health education and communication strategies into the 21st century, *Health Promot Int.* **15**(3) (2000), 259–267. doi:10.1093/heapro/15.3.259.
[45] D.W. Omariba and E. Ng, Health literacy and disability: Differences between generations of Canadian immigrants, *Int J Public Health.* **60**(3) (2015), 389–397. doi:10.1007/s00038-014-0640-0.
[46] R. Parker, Measuring health literacy: What? So what? Now what?, in: *Measures of Health Literacy: Workshop Summary, Roundtable on Health Literacy*, L. Hernandez, ed., National Academies Press, Washington, DC, 2009, pp. 91–98.
[47] C.L. Pavlish, S. Noor and J. Brandt, Somali immigrant women and the American health care system: Discordant beliefs, divergent expectations, and silent worries, *Soc Sci Med.* **71**(2) (2010), 353–361. doi:10.1016/j.socscimed.2010.04.010.
[48] L. Purnell, The Purnell model for cultural competence, *J Transcult Nurs* **13**(3) (2002), 193–196; discussion 200-201. doi:10.1177/10459602013003006.
[49] R.N. Qureshi, S. Sheikh, A.R. Khowaja, Z. Hoodbhoy, S. Zaidi, D. Sawchuck et al., Health care seeking behaviours in pregnancy in rural Sindh, Pakistan: A qualitative study, *Reprod Health.* **13**(Suppl 1:34) (2016).
[50] G. Rowlands, S. Dodson, A. Leung and D. Levin-Zamir, Global health systems and policy development: Implications for health literacy research, theory and practice, in: *Health Literacy: New Directions in Research, Theory, and Practice*, R. Logan and E. Siegel, eds, IOS Press, Amsterdam, 2017.
[51] K. Santo, S.S. Richtering, J. Chalmers, A. Thiagalingam, C.K. Chow and J. Redfern, Mobile phone apps to improve medication adherence: A systematic stepwise process to identify high-quality apps, *JMIR Mhealth Uhealth.* **4**(4) (2016), e132.
[52] J.K. Shim, Cultural health capital: A theoretical approach to understanding health care interactions and the dynamics of unequal treatment, *Journal Health Soc Behav.* **51**(1) (2010), 1–15. doi:10.1177/0022146509361185.
[53] R. Telama, X. Yang, L. Laakso and J. Viikari, Physical activity in childhood and adolescence as predictor of physical activity in young adulthood, *Am J Prev Med.* **13**(4) (1997), 317–323.
[54] The Millennium Development Goals Report 2015, United Nations, New York, 2015.
[55] Tracking Universal Health Coverage. First global monitoring report, World Health Organisation and The World Bank, France, 2015, p. 1.
[56] E. Vida Estacio, R.K. McKinley, S. Saidy-Khan, T. Karic, L. Clark and J. Kurth, Health literacy: Why it matters to South Asian men with diabetes, *Prim Health Care Res Dev.* **16**(2) (2015), 214–218. doi:10.1017/S1463423614000152.
[57] N. Warfa, K. Bhui, T. Craig, S. Curtis, S. Mohamud, S. Stansfield et al., Post-migration geographical mobility, mental health and health service utilization among somali refugees in the UK: A qualitative study, *Health Place.* **12** (2006), 503–515. doi:10.1016/j.healthplace.2005.08.016.
[58] World Health Organization. Health literacy. The solid facts. Copenhagen: WHO Regional Office for Europe, 2013.