



Migrants' wellbeing and use of information and communication technologies

Review

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ABSTRACT

Background: Migrants use Information and communication technologies [ICTs] to structure, mediate, and sustain transnational social connections. The impacts of ICT use on migrants' social lives and overall wellbeing is not well understood. **Methods:** Arksey and O'Malley's (2005) approach to scoping reviews was used and a thematic analysis was undertaken to synthesize relevant literature. **Findings:** A total of 37 articles were identified for inclusion in this review. Studies described a variety of ICT-mediated transnational social activities and focused on one or more dimension of social, mental and emotional wellbeing. Thematic analysis provided a description of: (a) barriers and facilitators of ICT use in transnational contexts, (b) types of ICT-mediated transnational activities; and (c) influences of ICT use on migrants' wellbeing. Migrants' connections with family, kin, and friends decreased stress, anxiety, and loneliness, and increased happiness, coping, and social support. Expectations around remittances, emotional distress in times of crises, and differing expectations of ICT-mediated relationships negatively influenced the wellbeing of migrants. Visual technologies were shown to have the most tangible influences on wellbeing. **Conclusion:** ICT use is high in migrants and emotional, mental, and social wellbeing is clearly influenced by ICT-mediated relationships. Further research is required to explore the intensity and conditions of these influences across different contexts, genders, and digital mediums.

KEYWORDS

Information and Communication Technology, Migrant, Scoping Review, Social Media, Transnational, Wellbeing

INTRODUCTION

Currently there are 272 million international migrants globally. These individuals are defined as any person who has changed their country of usual residence and includes mainly long-term immigrants, migrant workers and refugees (International Organization for Migration [IOM], 2020). The wellbeing of migrants continues to be a focus of study with evidence of negative health outcomes in particular sub-populations (Aldridge et al., 2018; Bustamante et al., 2018; Byrow et al., 2019; Das-Munshi et al., 2012; Markides & Rote, 2019; Vang et al., 2017). Despite variations in migrants' experiences, discussions of their wellbeing often adopt a local lens and neglect transnational dimensions. Migrants possess cross-border identities, ties, and commitments within transnational social, political, and economic spaces (Levitt & Jaworsky, 2007; Schiller, 1994). Information and communication technologies [ICTs] are increasingly used by migrants to structure, mediate,

and sustain these transnational dimensions of their lives (IOM, 2020). Technologization of migration is used to describe the emergence of the "connected migrant" (Diminescu, 2008) and "new migration ecosystems" (Fortunati et al., 2013). Most significant is the emergence of accessible visual polymedia and social networking options that have amplified the co-presence of migrants with distanced others (Borkert et al., 2018).

Social connectedness relates to feelings of closeness, shared identities and common bonds, valuing relationships, and feeling socially involved, cared for and accepted (Hare-Duke et al., 2019; Kohli et al., 2009; O'Rourke & Sidani, 2017). Social connectedness created via ICT use in migrant populations has been studied in relation to integration into host societies, connections with local ethnocultural communities, and transnational



linkages to left-behind communities (Collin, 2012; Collin et al., 2015; Fortunati et al., 2013; Murphy & Mahalingam, 2004; Oiarzabal & Reips, 2012; Samari, 2016; Sanon et al., 2016; Viruell-Fuentes & Schulz, 2009). Being socially connected to one's local community potentially decreases loneliness and social isolation, improves social capital and results in positive health outcomes (Yiengprugsawan et al., 2018). Little, however, is known about the way ICT-mediated social connections across transnational spaces influence dimensions of wellbeing. Recent studies have begun to explore transnational influences on migrants' wellbeing such as use of transnational healthcare (Villa-Torres et al., 2017), transnational caregiving (Deneva et al., 2017), and cross-border identities and social networks (Ferrer et al., 2017; Samari, 2016). The ways ICT use attenuates, expands, or mediates the relationships between wellbeing and migrants' transnational lives has not been extensively explored in the health disciplines. This scoping review is a first step towards evaluating the scope of available knowledge on migrants' ICT use, wellbeing, and transnational social activities.

PURPOSE

The purpose of this scoping study was to map the scope and range of research literature pertaining to ICT use and related influences on wellbeing in the context of migrants' transnational lives.

METHODS

This scoping review was organized into five stages described below and based on the Arksey and O'Malley (2005) and Levac et al. (2010) frameworks:

Step 1: Identification of the research question

The first stage involved determining the scoping review question (Arksey & O'Malley, 2005; Levac et al., 2010). Key concepts related to the research question are: (a) "migrants", (b) "information and communication technologies" defined as the range of digital and social media used for communication and access to information, (c) "transnational social connections" defined as the social connections migrants create and sustain across two or more nation states (Basch et al., 1994); and, (d) "wellbeing" a multidimensional construct aimed at capturing

emotional, physical and psychosocial aspects of health (Marsh et al., 2020).

Step 2: Identification of relevant studies

Identifying relevant studies involves balancing the breadth and depth of the scoping review with feasibility (Arksey & O'Malley, 2005). We searched the following electronic databases: Ovid MEDLINE, Ovid EMBASE, PsycINFO, CINAHL, SocIndex, Cochrane Library, SCOPUS, Web of Science, Sociological Abstracts, and ProQuest Dissertations & Theses Global. Search phrases included various combinations of "migrant", "immigrant", "refugee", "foreign/temporary worker", "undocumented" AND "transnational", "diaspora" AND "information and communication technology", "technology", "social media", "social networking". For non-health databases we added "health", "wellness", and "wellbeing" as search terms to limit our findings to references that address some dimension of wellbeing. An academic health sciences librarian at the University of Alberta collaborated with the first author (JS) to develop the search strategy and execute the searches. Publications included in this review were limited to English language articles and published from inception to April 2019. We followed up our search of electronic databases with backward and forward reference searching of articles identified for inclusion.

Step 3: Study Selection

Study selection involved post hoc inclusion and exclusion criteria, based on increasing familiarity with the literature. These criteria are based on the specifics of the research question and new familiarity with the subject matter through reading the studies (Arksey & O'Malley, 2005). The selection of studies for inclusion was an iterative process, as recommended by Levac et al. (2010), in which we searched the literature, refined the search strategy and inclusion criteria, and reviewed articles for inclusion ([Table 1](#)).

We used a three-step process for study selection, using the inclusion/exclusion criteria identified above. First two reviewers (LK, SA) screened the titles of all articles identified through electronic database searches and snowball sampling. Second, the two reviewers (LK, SA) independently screened abstracts of articles included in Step 1 for eligibility and



excluded those that did not mention selected migrant populations, ICT use, or transnational social connections. Reviewers met upon completion to compare results and resolve discrepancies which were resolved by the first author (JS). Two reviewers (LK, SA) then independently read the full texts of articles included in Step 2 to identify articles that mention some aspect of wellbeing. These articles were included in the final set of chosen articles. If exclusion was suggested, it was confirmed by the third reviewer (JS). This approach of reading full texts to determine references to wellbeing versus determining this at the abstract review stage was chosen to ensure that we captured the full range of possible articles. Describing or measuring wellbeing is often not an explicit objective mentioned in the abstract of these articles. We used Refworks to manage study selection and the review process with all references combined and saved in RefWorks. Study selection is reported as per PRISMA guidelines in [Figure 1](#).

Step 4: Charting the Data

The three reviewers extracted data from the full texts of articles included in the review using a standardized extraction form and descriptive-analytical techniques (Arksey & O'Malley, 2005; Levac et al., 2010). Information was extracted from included studies using an excel spreadsheet identifying the characteristic of the studies. For each included article, we charted: author(s), year of publication, country of migration, country of emigration, population of interest, sample/size, study aim, methodology, types of ICTs used and related ICT-mediated transnational social activities, and influence of ICT utilization on wellbeing.

Step 5: Collating, Summarizing and Reporting the Results

The final stage involved analysis of the data charted, reporting of results and determining the implications of findings (Arksey & O'Malley, 2005; Levac et al., 2010), which was a collaborative process among all authors. A descriptive thematic analysis (Braun & Clarke, 2006; Vaismoradi et al., 2013) was undertaken to synthesize the literature by using NVivo 10 data analysis software. We report below the types of studies included, followed by a thematic analysis of the main review findings.

RESULTS

A total of 37 articles were included in our scoping review ([Table 2](#), [Table 3](#)). All the articles were peer-review publications with the exception of three that were dissertations. Articles spanned transnational contexts with the majority of studies focusing on the experiences of migrants to Western and industrialized nations connecting to communities in the developing world. This pattern is consistent with the global flow of migrants (IOM, 2020). The majority of studies were qualitative (n=31) with a minority of quantitative surveys and mixed method designs (n=6). All studies described different types of ICT-mediated transnational social activities and focused on one or more dimension of social, mental and emotional wellbeing. We describe below the main themes identified in the scoping review: (a) barriers and facilitators of ICT use in transnational contexts, (b) types of ICT-mediated transnational activities; and (c) influences of ICT use on migrants' wellbeing.

Barriers & Facilitators of ICT Use in Transnational Contexts

This review indicates an overall satisfaction with the use of ICT to maintain transnational social connectivity due to the emergence of user-friendly low-cost applications with visual dimensions that enhance virtual co-presence with those left-behind in countries of origin. Social media, such as Skype, Facebook, and WhatsApp, were effective in promoting communication, sharing and gathering of information, and deepening of social relations between migrants and their transnational social networks (Gonzalez & Katz, 2016; Khvorostianov et al., 2012; King-O'rian, 2015; Nedelcu, 2017; Nedelcu & Wyss, 2016; Shoko, 2015; Wilding, 2006).

Migrants reported using different forms of ICT, often simultaneously, to facilitate these connections, including computers, smartphones, laptops, and tablets with a wide array of digital applications (Ahlin, 2018; Chib et al., 2014; Farshbaf Shaker, 2018; Madianou, 2016). Migrants who experienced barriers to internet connectivity, preferred to maintain transnational connections via phone calls which are increasingly cost-effective across the globe (Farshbaf Shaker, 2018; Nedelcu & Wyss, 2016; Lin & Sun, 2010).



Barriers to using ICT included prohibitive costs, lack of technology infrastructure in left-behind communities, logistical constraints, and low digital literacy of family members, especially older adults and those in rural settings. This review reinforced the fact that information and communication infrastructure is not equally distributed across global contexts with the most notable contrast between urban centers in the Global North and rural communities in the Global South (Berg, 2007; Chib et al., 2014; King-O'rian, 2015; Vancea and Olivera, 2013; Şenyürekli & Detzner, 2009; Walker, 2018). This lack of digital infrastructure in some contexts constrained migrants' ability to connect with left-behind communities. Internet cafés, libraries, and workplaces emerged as supportive spaces that can facilitate technology access for migrants and those left-behind (Baldassar, 2007; Chib et al., 2014; King-O'rian, 2015; Şenyürekli & Detzner, 2009; Wilding, 2006).

Early ICT modes of communication via landline phones and email were expensive as they required owning a computer or phone and paying user fees for internet and phone access, with some participants reporting the need to actively limit their social contact with others or find additional sources of income to maintain these connections (Berg, 2007; Nedelcu & Wyss, 2016). Other participants reported that recent smartphone technologies and social media have eased some of the financial and logistical barriers due to the availability of free or low-cost digital applications (Madianou, 2012; Khvorostianov et al., 2012). Older adults, overall, had lower digital literacy and poorer health which was likely to limit ICT use in reported studies (Ahlin, 2018; Wilding, 2006; Zhang, 2016).

A facilitator of older adults' adoption of ICT identified related to social support from family and friends (Ahlin, 2018; Nedelcu, 2017; Zhang, 2016). Logistical challenges such as time zone differences, interruptions, data plan restrictions, and spotty connectivity meant that migrants and those in their social networks re-structured activities and behaviors to facilitate timely and consistent social contact (Berg, 2007; Harney, 2013). At times, this re-structuring involved financial and resource intensive commitments especially on the part of the migrant (Aguila, 2009; Ahlin, 2018; Berg, 2007; Madianou, 2012; Walker, 2018). Overall, migrants are shown in

this review to be resourceful and to allocate a significant amount of time and financial resources to using ICTs for transnational social connectivity and, in turn, facilitating the adoption of ICT in left-behind communities.

Types of ICT-Mediated Transnational Social Activities

ICT-mediated transnational social connections were described across one or more of the following three areas: (a) parenting and caregiving, (c) maintaining social connections, defined as habitual and sustained contact with family, kin, and social contacts in the emigration context; and (d) participation in life events, defined as intermittent conditions of intense contact for an emergent purpose.

Parenting and Caregiving: Parenting of dependent children and family caregiving of older parents and grandparents were two ICT-mediated transnational social activities characterized by consistent virtual co-presence with the intensity of co-presence increasing in crisis situations (Aguila, 2009). This co-presence can be described as involvement in the day-to-day happenings, fluctuations, and decision-making within transnational families. Terms such as “keep-up”, “check-in”, “keep-track”, and “monitor” were frequently cited by participants in the reviewed studies as a characteristic of their daily connectivity, especially with children (Berg, 2007; Chib et al., 2014; Lin & Sun, 2010; Şenyürekli & Detzner, 2009). Often this co-presence with dependents involved a continuation of the parenting role at a distance through provision of practical and emotional support. Most studies involved migrant mothers versus fathers.

A dimension of surveillance was noted through monitoring homework and chores, reprimanding misbehavior, and following up on health concerns (Aguila, 2009; Brown, 2016; Chib et al., 2014; Madianou, 2014; Madianou, 2016; Ryan et al., 2015; Thomas & Lim, 2017). Emotional support involved attending to children's changes in mood, showing love and affection, and maintaining parental bonds (Brown, 2016; Chib et al., 2014; Francisco, 2015; Madianou, 2012).



For caregiving of older parents and grandparents, practical support in the form of following up on health concerns and monitoring proxy caregivers were most notable across studies (Baldassar, 2016; Nedelcu, 2017). In addition, new ways of enacting filial piety were demonstrated through frequent calls to aging parents versus in-person visits and co-habitation (Ahlin, 2018; Nedelcu & Wyss, 2016; Zhang, 2016). Parenting and caregiving activities were enhanced via visual elements of technology such as webcams and skype allowing migrants to evaluate non-verbal cues, monitor the household, and visualize daily happenings and rituals in real time (Francisco, 2015; Gonzalez & Katz, 2016; King-O'riain, 2015; Madianou, 2012; Ryan et al., 2015; Vancea & Olivera, 2013).

Maintaining Social Connections: Connecting with relatives, kin, and friends in emigration contexts was reported across studies to keep well-informed of local events, sustain emotional closeness, facilitate provision of tangible supports, and maintain migrants sense of belonging and identity (Chen, 2010; Chib et al., 2013; Harney, 2013; Heikkinen & Lumme-Sandt, 2013; Kim, 2016; Khvorostianov et al., 2012; Lin & Sun, 2010; Madianou, 2016; Park, 2016; Ryan et al., 2015; Şenyürekli & Detzner, 2009; Vancea & Olivera, 2013; Wilding, 2006; Zhang, 2016).

Transnational families used ICT to communicate both good news (e.g., birth, wedding, graduation) and bad news (e.g. illness, death) (Adugna, 2018; Baldassar, 2007; Baldassar, 2014; Wilding, 2006). This enhanced the sense of closeness between migrants, families, and extended social networks (Baldassar, 2007; Vancea & Olivera, 2013) and helped maintain social ties between geographically disparate community members (Withaecx et al., 2015). Intergenerational aspects included connecting with grandchildren to practice the mother-tongue and build emotional bonds (Baldassar, 2016; King-O'riain, 2015). Migrants used different forms of multimedia to maintain this connectivity considering the effects of cost, accessibility for themselves and emigrant communities, and level of intimacy allowed via different technology mediums (Aguila, 2009; Ryan et al., 2015; Vancea & Olivera, 2013). Connectivity also allowed migrants to fulfill expectations of reciprocity that characterize many migrant relationships with communities in countries of origin (Berg, 2007; Madianou, 2014; Thomas & Lim, 2017).

Participation in Life Events: For migrants who could not return to their communities of origin, ICT facilitated connectivity during important life events such as offering best wishes during births and weddings, condolences for a death, and virtual attendance at ceremonies and rituals (Baldassar, 2014; Bravo, 2017; Şenyürekli & Detzner, 2009; Wilding, 2006). The need to engage in transnational communication was heightened when a family experienced a crisis, such as the illness or death of a loved one, and this was characterized by a period of intense connectivity until the crisis passed (Baldassar, 2014; Bravo, 2017; Gonzalez & Katz, 2016). Adugna (2018) noted that Ethiopian elders used ICT to solve inter-tribal tensions between transnational families and migrant workers in South Africa; while immigrants in Brown's (2016) study used a Facebook page to publicize a fundraising campaign for educational and infrastructural projects to support children and families affected by a natural disaster in their home country. Migrants across studies in this review were able to create networks of solidarity and support that were called upon in times of crisis and ICT facilitated information sharing and the provision of support during these times. Notable in reviewed studies was that the direction of financial supports in times of crisis flowed mainly from migrants to left-behind communities while the exchange of emotional support was often reported as being bi-directional.

Influences of ICT Use on Migrants' Wellbeing

The two areas where wellbeing was explicitly referenced in this review were in relation to maintaining valued social roles and relationships and receiving social support from left-behind communities. Social support refers to the actual and perceived emotional, informational, and practical assistance people receive from significant others in their lives (Cohen, 2004). Two themes were identified to describe the influences of ICT use on migrants' wellbeing: (a) role maintenance versus disruption, and (b) reciprocal channels of social support.

Role Maintenance versus Disruption: The heightened ability of migrants to connect with family and kin in countries of origin allowed for the continuation of social roles and obligations that would be expected if they were still in proximity. This continuation depended on the effective use of ICT which mediated these relationships. Migrants reported feeling



empowered in their ability to continue their roles as parents of young children (Berg, 2007; Brown, 2016; Chib et al., 2014; Francisco, 2015) or caregivers of elderly parents (Ahlin, 2018; Baldassar, 2014; Farshbaf Shaker, 2018; Nedelcu & Wyss, 2016; Zhang, 2016). Parenting and caregiving were where the most impact on wellbeing via sustained and intense ICT-mediated role continuation was evident. Migrants reported enhanced emotional wellbeing due to satisfaction with their ability to continue these roles and maintain valued dimensions of identity tied to these roles (Aguila, 2009; Baldassar, 2016; Farshbaf Shaker, 2018; Madianou, 2012; Nedelcu & Wyss, 2016; Zhang, 2016). ICT, also, facilitated coping with the stressors of migration by creating a sense of comfort and family solidarity (Brown, 2016; Farshbaf Shaker, 2018; Nedelcu & Wyss, 2016). Image-based ICTs were used to strengthen family bonds between parents and their migrant children and grandchildren and was especially relevant in enhancing feelings of intimacy (Ahlin, 2018; Francisco, 2015; Nedelcu & Wyss, 2016; Park, 2016). The perceived benefits from enhanced co-presence via image-based ICTs surpassed that of other ICTs, such as email, reported in other studies (Wilding, 2006).

Social roles, however, could also be disrupted pointing to the inadequacy of ICT-mediated role continuation in particular instances. Self-censorship was often reported by families and migrants where this dual process of censorship limited reciprocal emotional support and comfort during stressful times (Aguila, 2009; Baldassar, 2007; Chib et al., 2014; Walker, 2018). Image-based ICTs could be painful reminders of the absence of loved ones and were sources of distress for some who could not engage in the physical tasks of care such as caressing a loved one or sharing a meal (Baldassar, 2014; Brown, 2016; Wilding, 2006). In times of crises, ICT-mediated communication was a source of timely updates that either relieved anxieties when migrants were able to provide emotional or material supports (Baldassar, 2014; Bravo, 2017; Díaz Andrade & Doolin, 2019; Gonzalez & Katz, 2016; Nedelcu & Wyss, 2016; Shoko, 2015; Withaecx et al., 2015) or aggravated anxieties when support was constrained (Chib et al., 2014). Tensions between proxy caregivers and migrants required ongoing management via ICT to ensure the needs of proxy caregivers, which were often financial, and the needs of left-behind children were met while simultaneously managing the emotional distress of

delegating valued parenting/caregiving tasks to others (Chib et al., 2014; Francisco, 2015; Madianou, 2012). Finally, distress was reported by migrant parents whose children resisted ongoing and intense ICT-mediated connectivity (Berg, 2007) and by migrant children pressured to maintain connectivity with family in countries of origin (Gonzalez & Katz, 2016).

Overall, the above examples point to the positive and negative impacts of ICT-based role maintenance across transnational contexts on the wellbeing of migrants. It is evident that ICTs, especially image-based ICTs, are central to families' ability to maintain a sense of normalcy and co-presence. It is equally evident that anxiety and stress can emerge when challenges are witnessed that cannot be addressed at a distance or when a mismatch exists between the expectations of migrants and those left-behind.

Reciprocal Channels of Social Support: Daily connections with family, kin, and friends were maintained through social media and mobile chat applications with reports of general satisfaction with using these tools (Farshbaf Shaker, 2018; Gonzalez & Katz, 2016; Madianou, 2016; Şenyürekli & Detzner, 2009). Polymedia, the use of different types of image-based ICTs to enhance and sustain virtual co-presence, was shown to have a clear and positive impact on migrants' reports of emotional support (Baldassar, 2016; Brown, 2016; Díaz Andrade & Doolin, 2019; Farshbaf Shaker, 2018; Francisco, 2015; KING-O'RIAN, 2015; Shoko, 2015; Thomas & Lim, 2017; Walker, 2018; Wilding, 2006). During the migration transition, migrants encountered various challenges related to loneliness, homesickness, and settlement barriers in a new environment. Emotional support, practical advice, and financial support to manage the hardships of migration were provided by left-behind family and enhanced migrants' self-reported resilience (Baldassar, 2007; Díaz Andrade & Doolin, 2019; Farshbaf Shaker, 2018; Gonzalez & Katz, 2016; Kim, 2016; King-O'rian, 2015; Ryan et al., 2015; Shoko, 2015; Withaecx et al., 2015; Zhang, 2016).

ICT-mediated connectivity resulted in a reported decrease in feelings of stress, isolation and loneliness (Harney, 2013; Khvorostianov et al., 2012; Lin and Sun, 2010; Shoko, 2015; Vancea & Olivera, 2013; Withaecx et al., 2015; Zhang, 2016), supported adaptation in the host country (Chen, 2010), and



enhanced feelings of positive identity, belonging and validation (Lam, 2014; Park, 2016). Happiness and satisfaction were reported by migrants who used Facebook, for example, to connect with left-behind friends and relatives (Gonzalez & Katz, 2016).

Additionally, migrants reported maintaining professional and cultural identities through connecting with friends and engaging in social media platforms focused on their diverse interests (Brown, 2016; Khvorostianov et al., 2012; Lin & Sun, 2010; Park, 2016; Withaecx et al., 2015). Migrants, also, utilized ICT to access information via their social networks about the migration process, health, employment, as well as to communicate personal, social, and political news between emigration and migration contexts (King-O'riain, 2015; Khvorostianov et al., 2012; Vancea & Olivera, 2013; Walker, 2018; Zhang, 2016).

In some cases, the internet and social media was used to communicate discrete and unofficial information on emerging events (Brown, 2016; Şenyürekli & Detzner, 2009; Shoko, 2015). The one study that focused on a gender differences in ICT use and related outcomes showed that women were more likely to receive instrumental, emotional, and informational sources of social support than their male migrant counterpart (Chib et al., 2013). In the same study, women reported less stress due to received emotional support but this positive effect was not observed in men. Access to social support across transnational contexts required migrants manage the cost and time needed to access technology and be attentive to the struggles, stressors, and needs of those left behind (Berg, 2007; Nedelcu & Wyss, 2016; Ryan et al., 2015). ICT can make it difficult for migrants to escape expectations of reciprocity within familial and kin networks which was the main reported source of stress with ICT use for transnational social connectivity (Madianou, 2012). Overall, studies show positive impacts of ICT-use for the exchange of transnational social support between migrants and left-behind communities with a number of stressors emerging where the net impact on wellbeing is unknown and requires further exploration.

DISCUSSION

Migrants connected with family, kin, and friends reported outcomes of decreased stress, anxiety, loneliness, and increased happiness, coping, and access to information and material supports in times of need. On the other hand, particular migrant experiences such as expectations of reciprocity that could not be met, virtual co-presence enhancing emotional distress in times of crisis, and differing expectations around the intensity and quality of ICT-mediated relationships were all reported to negatively influence the wellbeing of migrants. Migrants, also, experienced stressors in access and use of ICTs where the burden to “connect” often fell on the migrant who was perceived to have more resources than those in left-behind communities.

Additionally, this review points to the critical role of digital infrastructure in emigration contexts on the extent and types of ICTs adopted by migrants with evidence that the digital divide across the Global South and North and between rural and urban contexts persists (IOM, 2020). Only one study in this review focused on comparing wellbeing outcomes across genders in relation to ICT use and transnational social activities with women reporting more frequent ICT-mediated contact and more perceived support than their male counterparts.

A number of studies, although not referencing wellbeing explicitly, discuss the influences of transnational ICT use on gendered, cultural, and structural aspects of familial and social relationships (Cabanes & Acedera, 2012; Barakji et al., 2019; Hsu, 2018), while some studies have looked specifically at the gendered dimensions of wellbeing and transnational relationships (Afulani et al., 2016; Amoyaw & Abada; 2016). The review highlights the need to consider the impact of ICT on transnational social roles and relationships with a focus on gender dynamics and power relations. Beyond gender as a single factor, this review shows some of the ways other factors such as age, socioeconomic status, and rural/urban divide shape experiences of ICT use in transnational contexts. Intersectional perspectives address the influences of multiple social identities and locations on outcomes of privilege or oppression in people's lives (Anthias, 2012; Crenshaw, 1991) and can be useful approaches to looking at the non-mutually exclusive categories of identity and



belonging as they are shaped by particular transnational experiences. Areas for future research include the need to conduct studies with the explicit objective of understanding the influence of ICT on wellbeing in migrant populations. These studies need to quantify the intensity and forms of ICT-mediated transnational activities and the types of digital tools used for these activities in relation to measures of wellbeing, which will require creative solutions to address methodological challenges (Alinejad et al., 2019; Vancea & Àlex, 2014).

The impact of visual or image-based technologies on wellbeing seems the most tangible across reviewed studies and with the proliferation of accessible and affordable social media platforms comes the need to determine which dimensions of wellbeing are most influenced. Finally, this review did not focus on the perspectives of those left behind and their communication patterns, preferences, and related influences on wellbeing. Evidence shows both positive and negative influences on wellbeing for left-behind communities (Benítez, 2012; Horst, 2006), and further evaluation of this dimension of transnational connectivity is warranted.

IMPLICATIONS

ICTs have allowed relationships between migrants and distanced others to diversify and intensify with tangible implications for the migration experience (Collin, 2012). However, further exploration is required on how to best support this transnational dimension of migrants' lives to facilitate positive psychosocial experiences post-migration (Bacigalupe & Cámara, 2012). Facilitating migrants' access to ICT and building digital competence might enhance the mental and emotional wellbeing of migrant populations via access to transnational channels of social support. Digital competence is defined as "the combination of knowledge, skills, and attitudes with regards to the use of technology to perform tasks, solve problems, communicate, manage information, and collaborate..." (Skov, 2016). Digital learning interventions are most needed for vulnerable groups of migrants such as newcomers, older adults, women, and those with lower levels of education and socioeconomic resources (Haight et al., 2014; Fang et al., 2019). This review points to key factors to consider in developing digital learning interventions. While local barriers and facilitators to ICT adoption

are identified in the literature (Collin & Karsenti, 2012; Felton, 2015), additional influences include digital infrastructure in countries of origin and norms and expectations around technology use. Also, this review points to the ability to connect with left-behind communities as a strong motivator for adopting digital technologies and can encourage digital learning; this finding is mirrored in other studies (Kabbar & Crump, 2006; Millard et al., 2018).

Finally, the review describes connections between ICT use and dimensions of migrants' wellbeing post-migration which raises the need for further exploration of the nature, pathways and intensity of these relationships. The mental health impacts of participating at a distance in the lives of those left behind, especially during times of crisis, needs further exploration. The impacts on wellbeing might be more severe for migrants who experience socio-economic deprivation, have precarious migration status and in contexts where migration policies limit transnational movement.

LIMITATIONS

A significant limitation of this study relates to our definition of wellbeing. Wellbeing is a multidimensional construct with both subjective and objective measures that differ widely across disciplines and research contexts (Marsh et al., 2020). Our review focused on subjective wellbeing related to emotional, mental, and social dimensions, such as presence of positive emotions (happiness), absence of negative emotions (stress, anxiety, loneliness), availability of social support and presence of positive relationships. We acknowledge that a broader definition of wellbeing, such as one that includes objective circumstances, might capture a wider array of literature on the topic.

We, also, acknowledge the subjective nature of determining which studies to include in this review based on what constituted an adequate description of migrants' wellbeing. Only one study explicitly measured wellbeing as an outcome and the majority of studies were from the non-health literature and qualitative in nature. We see this review as a starting point to developing a conceptual framework of wellbeing in the context of transnational connectivity and ICT use similar to the discussion of Skrbiš (2008) on conceptualizing "emotions' in the transnational



sphere of relationships. Finally, we recognize that migrants exist on a “low mobility-high mobility continuum” (Diminescu, 2008) and, hence, the included migrant categories reflect a range of statuses along this continuum. Excluded from this review were particular populations that might have unique experiences with ICT use that warrant exploration such as internally displaced individuals and international students.

CONCLUSION

This review is a preliminary exploration of the scope and range of literature on ICT use for transnational social connectivity and wellbeing. The review shows that ICT use is high across migrant populations, but that experiences and challenges differ based on intersecting factors within local and transnational contexts. The review, also, shows that emotional, mental, and social wellbeing are influenced by ICT use in relation to maintaining transnational social relationships and continuing valued social roles and responsibilities. The connections amongst intensity of ICT use, forms of ICT, and outcomes of wellbeing in the transnational context will continue to be a relevant and emerging area for exploration.

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Table 1: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Language	English	Other
Date of Publication	Open	-----
Populations	immigrants, refugees, foreign/temporary workers, undocumented migrants	Refugees in refugee camps, internally displaced peoples, & international students
Focus of Study	Studies focused on ICT use for transnational social activities <u>AND</u> that reference some aspect of wellbeing	Left-behind communities, other types of transnational activities (political, economic), or no reference to wellbeing
Types of Articles	Original research	Reviews and theoretical papers

Figure 1: PRISMA Flow Diagram

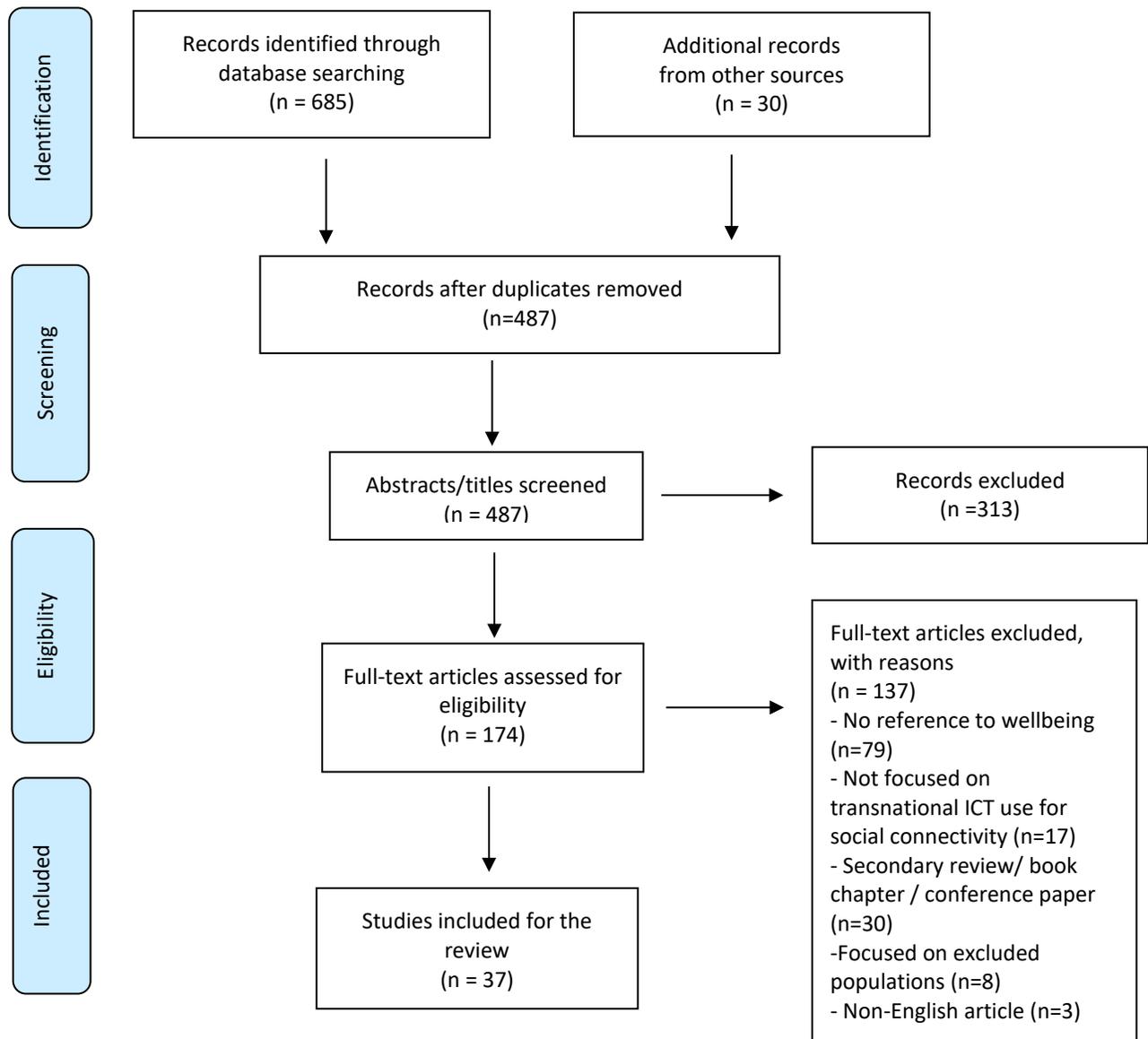


Figure 1. Flow diagram adapted from Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G. & The PRISMA Group. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine*, 6(7): e1000097. doi:10.1371/journal.pmed1000097



Table 2: Study Characteristics

Authors, Year	Country of Migration	Country of Emigration	Migrant Category	Study Methodology
Aduugna, 2017	USA, Israel	Ethiopia	Refugees, returnees & left-behind families n=19 cross-sectional survey of left-behind families n=845	Mixed methods (survey & interviews)
Aguila, 2009	Taiwan UK Saudi Arabia	Philippines	Temporary foreign workers n= 6	Qualitative (interviews)
Ahlin, 2017	Oman	India	temporary foreign workers & left behind families n=29	Qualitative (interviews & observation)
Baldassar, 2007	Italy	Australia	Immigrants n=40	Qualitative (interviews & observation)
Baldassar, 2014	Australia	Italy, Netherlands, Ireland, Singapore, New Zealand, Afghanistan, Iraq, Iran	Immigrants & refugees n=200	Qualitative (interviews & observation)
Baldassar, 2016	Australia Ireland	Italy	Immigrants n=13	Qualitative (interviews)
Berg, 2007	USA	Peru	Multi-generational transnational families n=8	Qualitative (interviews & observation)
Bravo, 2017	United States	Latin America	Undocumented migrants n=12	Qualitative (interviews)
Brown, 2016	Israel	Philippine, Nepal	Temporary foreign workers n=33	Qualitative (interviews)
Chen, 2010	Singapore	China	Immigrants n=710	Quantitative (Survey)
Chib, 2013	Singapore	Bangladesh, India, Philippines, Indonesia	Immigrants n=710	Quantitative (Survey)
Chib, 2014	Singapore	Singapore, Philippine	Temporary foreign workers n=40	Mixed methods (survey, focus groups, interviews, & observations)
Díaz Andrade, 2015	New Zealand	Burma, Bhutan Colombia, Democratic Republic of Congo,	Refugees n=53	Qualitative (interviews)



		Eritrea, Ethiopia, Iraq, Rwanda		
Farshbaf Shaker, 2018	Australia	Iran	Immigrants n=25	Qualitative (interviews)
Francisco, 2015	USA	Philippine	Documented/undocumented temporary foreign workers n=50 Left-behind family members n=25	Qualitative (interviews, focus groups, participant observation)
Gonzalez, 2016	USA	Latin America	Immigrant & non-immigrant children n=166 Immigrant & non-immigrant parents n=170	Qualitative
Harney, 2013	Italy	Nepal	Migrants n=3	Qualitative (interviews & observation)
Heikkinen, 2013	Finland	Ukraine, Kazakhstan, Russia	Older adult immigrants n=13	Qualitative (interviews)
Khvorostianov, 2011	Israel	Former Soviet Union	Older adult immigrants n=32	Qualitative (interviews)
King O'riain, 2015	Ireland	France, Canada, USA, UK, Malaysia, India, Sri- Lanka, Poland, Zimbabwe, China	Transnational families n=26	Qualitative (narrative interviews)
Lam, 2014	USA	Latin America, Asia	Immigrant youths n=2	Qualitative (case studies)
Lin, 2010	Singapore	Not stated	Temporary foreign workers n=68	Mixed methods (survey & interviews)
Madianou, 2012	UK	Philippines	Foreign workers (skilled & unskilled) and some children of workers n=105	Qualitative (interviews)
Madianou, 2014	UK	Philippine	Migrants n=13	Qualitative (interviews)
Madianou, 2016	UK	Phillipine	Migrants n=13	Qualitative (interviews)
Nedelcu, 2017	Switzerland and Canada	Romania	n=39	Qualitative (interviews)
Nedelcu, 2016	Switzerland	Romania	n=39	Qualitative (interviews)
Park, 2017	USA	Korea	Immigrants n=154	Mixed method (photo-elicitation interviews & surveys)



Ryan, 2015	UK	USA, France	Highly-skilled migrants n= 73	Qualitative (interviews)
Shoko, 2015	South Africa	Zimbabwean	Migrants n=30	Qualitative (interviews)
Senyurekli, 2009	USA	Turkey	Immigrants n=30	Qualitative (interviews)
Thomas, 2010	Singapore	India, Philippine	Temporary foreign workers n=20	Qualitative (ethnographic interviews)
Vancea, 2013	Spain	Ecuador, Morocco, Romania	Migrants n=35	Qualitative (interviews)
Walker, 2018	USA	Tanzania Afghanistan Iraq	Migrants n=5	Qualitative (photo elicitation in-depth interviews)
Wilding, 2006	Australia	Ireland, Italy, Netherlands, Iran, Singapore, New Zealand	Immigrants & refugees n=200	Qualitative (interviews & observation)
Withaeckx, 2015	Belgium	Brazil and Morocco	Migrants n=47	Mixed-method (interviews & focus groups)
Zhang, 2016	New Zealand	China	Older adult migrants n=35	Qualitative (interviews)



Table 3: Study Results

Authors, Year	ICT-Mediated Activities	Reported Influences on Wellbeing
A dugna, 2017	Caregiving Access emotional support Access information Maintain social connections	Improved emotional and social wellbeing
Aguila, 2009	Parenting Maintain social connections	Inconsistent results: Improved emotional and social well-being. In contrast, lack of non-verbal cues results in conflict and misunderstanding
Ahlin, 2017	Caregiving / parenting	Improved emotional and social wellbeing
Baldassar, 2007	Participate in life events Access emotional support Maintain social connections	Improved emotional and social wellbeing
Baldassar, 2014	Caregiving Maintain social connections	Inconsistent results: Improved emotional, spiritual, and social wellbeing but can initiate negative emotion e.g. feelings of loss or absence
Baldassar, 2016	Caregiving / Parenting Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can increase conflict
Berg, 2007	Caregiving/ Parenting Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can create anxiety
Bravo, 2017	Caregiving Access emotional support Participate in life events Maintain social connections	Improved physical, emotional and social wellbeing
Brown, 2016	Parenting Access emotional support Access information	Inconsistent results: Improved emotional and social wellbeing but can disrupt personal identity.
Chen, 2010	Access emotional support Access information	Inconsistent results: Improved physical, emotional and social wellbeing but can hinder sociocultural adaptation to local context
Chib, 2013	Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing in women but stress amplified in men
Chib, 2014	Parenting Access emotional support Maintain social connections	Inconsistent results: Improved emotional, spiritual, and social wellbeing but can result in negative emotions e.g. sadness
Díaz Andrade, 2015	Caregiving Access emotional support Maintain social connections	Improved emotional, spiritual, and social wellbeing



Farshbaf Shaker, 2018	Caregiving Access emotional support Maintain social connections	Improved emotional, spiritual, and social wellbeing
Francisco, 2015	Parenting Maintain social connections	Improved emotional and social wellbeing
Gonzalez, 2016	Caregiving Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can result in negative emotions e.g. feelings of loss or disconnectedness
Harney, 2013	Parenting Access emotional support Maintain social connections	Improved emotional, spiritual, and social wellbeing
Heikkinen, 2013	Participate in life events Access emotional support Maintain social connections	Improved emotional, and social wellbeing
Khvorostianov, 2011	Access emotional support Access information Maintain social connections	Improved physical, emotional, spiritual, and social wellbeing
King O'riain, 2015	Parenting Access emotional support Assess information Participate in life events Maintain social connections	Improved emotional and social wellbeing
Lam, 2014	Emotional support Maintain social connections	Improved emotional and social wellbeing
Lin, 2010	Caregiving/ parenting Access emotional support Access information Maintain social connections	Improved emotional and social wellbeing
Madianou, 2012	Parenting Access emotional support	Inconsistent results: Improved emotional, spiritual, and social wellbeing but can result in negative emotions e.g. stress, or disconnectedness
Madianou, 2014	Caregiving Access emotional support Maintain social connections	Improved emotional and social wellbeing
Madianou, 2016	Parenting Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can result in loss of privacy
Nedelcu, 2017	Caregiving Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can result in emotional distress
Nedelcu, 2016	Caregiving Access emotional support Maintain social connections	Improved emotional, spiritual, and social wellbeing



Park, 2017	Access emotional support Maintain social connections	Improved emotional and social wellbeing
Ryan, 2015	Parenting Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can results in decrease in wellbeing during stressful life events
Shoko, 2015	Access emotional support Maintain social connections	Improved emotional and social wellbeing
Senyurekli, 2009	Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can initiate negative emotion e.g. distrust, frustration, and stress
Thomas, 2010	Access emotional support Maintain social connections	Inconsistent results: Improved emotional, spiritual and social well-being but can increase stress
Vancea, 2013	Caregiving Access information Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can increase negative emotions
Walker, 2018	Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can cause increase stress
Wilding, 2006	Parenting Participate in life events Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can result in negative emotions e.g. guilt and anxiety
Withaecx, 2015	Access emotional support Maintain social connections	Inconsistent results: Improved emotional and social wellbeing but can results in decrease in wellbeing during stressful life events
Zhang, 2016	Caregiving Access emotional support Access information Maintain social connections	Improved emotional, and social wellbeing