

PERCEPTION OF WELL-BEING AMONG PATIENTS IN COMMUNITY-BASED HOME HOSPITALIZATION IN THE ISRAELI PUBLIC HEALTH SYSTEM

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Abstract: *The correlation between patients' personal perceptions of their health and well-being, and the potential for recovery has gained importance for evaluating services provided by health organizations. Community-based home hospitalization (CBHH) is a new approach to hospitalization in the Israeli health system. We conducted a cross-sectional survey to examine the perceived well-being among 91 CBHH patients (mean age 65.2 years, 54.9% women) in Israel. Most participants (76.9%) were married and 72.5% were hospitalized due to an infectious disease. Perceived health and general well-being of the participants declined with increasing age. Married participants reporting better perceived mental and physical health. In addition, participants living in the central districts of Israel reported significantly better perceived physical and mental health compared to those living in peripheral districts. Multivariate regression analysis supported the hypotheses that married and younger patients enjoy better perceived physical well-being. At the same time, younger patients and those hospitalized with infectious diseases also perceive their mental well-being as better compared to older patients and those hospitalized in CBHH for other reasons. The study's findings offer useful insights for the planning and delivery of appropriate CBHH services. Particular attention should be paid to older patients, living on their own in peripheral areas of the country.*

Keywords: *home-based hospitalization, well-being, health system, management, patients*

Introduction

The dramatic increase in the number of elderly people in the world has a significant impact on the national policy of each country and implications for the allocation of national resources and budgets. The increasing life expectancy also affects family members, relatives, and friends who assist the elderly in old age. The aging of the population and the increasing consumption of health services due to increased morbidity in old age, together with the constant rise in the number of young chronic patients, have increased health services consumption and the demand for hospital beds. Hospitalization is costly for health systems and is a health risk for many patients due to medical complications related to the hospital stay (e.g., falls, infections, mistaken medications, and unnecessary tests) and the potential functional and cognitive and functional harm to patients, especially older patients. At the same time, it is a common view in many Western countries that elderly people should age in their natural place, while using family members as the primary source of support (Iecovich, 2011). Consequently, healthcare systems in various countries have been examining alternatives to traditional inpatient care for an extensive variety of medical conditions to improve patients' care experience and the health of the population, while reducing the per capita cost of healthcare (Adams, 2019). The development of home-based

hospitalization is of interest to physicians and nurses as well as managers of organizations that provide medical services and insurance because it has the potential for reducing financial expenditures while maintaining the provision of proper medical services (Iecovich, 2011).

In late 2017, Maccabi Health Services (MHS) was the first health maintenance organization (HMO) in Israel to implement an acute community-based home hospitalization (CBHH) program as an alternative to inpatient care (Prodan et al., 2021). Its operating model is based on existing models in other countries (Caplan et al., 2012; Lewis et al., 2012; Mendoza et al., 2009; Ram et al., 2004; Shepperd et al., 2008), with adaptation to the Israeli public health system. The target population of this hospitalization model includes patients with infectious diseases, (e.g. urinary tract infections, skin and skeletal infections, pneumonia), patients with chronic diseases that require hospitalisation due to exacerbations of the disease, and patients with metabolic disorders (e.g., dehydration). Patients considered suitable for CBHH are identified by a MHS nurse in the emergency department or in other hospital departments or in the community and are referred to CBHH as an alternative to hospital admission. The first visit by a physician or nurse is conducted within 2 to 4 hours of the patient's admission to CBHH, followed by daily visits by a physician, nurse and additional healthcare professionals as required (e.g. social worker, physiotherapist) according to the treatment plan. Treatment within this model also includes drawing blood for laboratory tests, complete supply of all required equipment and drug treatment in all routes of administration according to the prescribed doses, hydration, regular catheterisation, or drainage treatment, wound treatment, control of pain and associated symptoms and imaging tests. The duration of CBHH is limited to 3-5 days, but the stay may be extended according to the patient's medical condition. The patients are discharged from CBHH according to their medical condition and the attainment of treatment goals. Patients whose health had worsened during their CBHH are referred to the hospital from which they had been discharged and admitted to the ward in an orderly process that is defined by the hospital's management. A telephone answering service for medical advice is available around the clock. The entire inpatient healthcare regimen is documented as soon as the treatment is over and is typed into a dedicated computer system that interfaces with MHS systems. The medical record enables communication between the staff and forms part of the patient's medical record at the HMO.

We have previously shown that CBHH is perceived by managers in the Israeli public health system as a good alternative to inpatient care and as a service that must be further developed, especially due to the growing shortage of beds, hospitalization complications, the patient's desire to stay at home and the increasing public health costs. Nevertheless, the participants were not unanimous with regards to the economic viability of the existing model in terms of the Israeli HMOs operating CBHH, and the suitability of the service for all potential patients (Megido & Prodan, 2020). The quality of medical service, patient satisfaction, and developing a generalised approach to improving the quality and safety of care, are major elements of public health systems (Garcia-Lacalle & Bachiller, 2011). The correlation between patients' personal perceptions of their health and well-being, and the potential for recovery has become a major issue in examining the services provided by health organizations. Accordingly, obtaining a direct and subjective opinion of patients with different personal characteristics, regarding their health, in

addition to examining objective health outcomes, is perceived as important for the overall evaluation of any health service. Since CBHH is a new service in Israel, we aimed to examine the perceived well-being among CBHH patients in Israel. We hypothesized that (1) patients' demographic characteristics (age, marital status and residential district) will influence their perception of their general well-being in CBHH; (2) there will be differences in perceived well-being between participants hospitalized in CBHH due to infectious diagnoses and those hospitalized for other diagnoses.

Research methodology

Study design

This study was a cross-sectional survey study that was part of a larger mixed methods study (Megido & Prodan, 2020). The study was approved by MHS's ethics committee (approval number 004-20-MHS, date 11 March 2020).

Study participants and setting

Participants were recruited to the study using convenience sampling. Hence, no criteria for inclusion were identified before the participants were selected. The size of the planned sample included all patients discharged from CBHH of MHS from July to September 2020. Study participants were patients who had received treatment in a CBHH setting at Maccabi Health Services (HMO) between July and September 2020. Hebrew-speaking patients (or ones with a Hebrew-speaking caregiver) who had been treated in a CBHH setting for at least 3 days during the two months that preceded the study and who gave their consent to participate in the study were included. At the time of the study approximately 50 patients were hospitalized in CBHH every month. The sample selected for this study constitutes approximately 70% of these patients, encompassing all patients or caregivers who have expressed their consent to complete the questionnaire. The study assumes that the sample selected for this study represents the entire population of CBHH patients in Israel at the time of the study.

Research tool and data collection

The research tool used for data collection in this study was the Patient-Reported Outcomes Measurement Information System 10 (PROMIS-10) Global Health survey is a ten-item questionnaire that was developed by the United States National Institute of Health to assess generic health-related quality of life compared with normal values for the general population (Hays et al., 2009). It measures five domains: physical function, fatigue, pain, emotional distress, and social health on a five-point response matrix. Study participants (or their caregiver) completed the questionnaire. Completed questionnaires were collected and the data was typed into an Excel sheet (Microsoft Office 2019 software).

Data analysis

The data were analyzed using IBM SPSS Statistics for Windows, Version 25.0. (Armonk, NY: IBM Corp). Descriptive statistics of subject data was performed and expressed as means and standard deviations (SD) for continuous variables and as number and percentage for categorical variables. The two-sample T-test for independent samples was applied for testing the statistical significance of the difference in physical health and

mental health by age, marital status, participant residential district and reason for being admitted to CBHH. Multivariate linear regression models were applied to test the statistical significance of the difference in physical and mental health by demographic and clinical variables. All statistical tests were two-sided. P-values less than 0.05 were considered statistically significant.

Results

A total of 91 participants (mean age [SD], 65.2 years [16.9]; 54.9% women) were included in the study. The Participants' sociodemographic characteristics and reason for CBHH are shown in table 1. Most participants (76.9%) were married. The main reason for hospitalization was an infectious disease (72.5% of participants).

Table 1. Participant characteristics

Variable	Study population N=91
Sex, n (%)	
Men	41 (45.1%)
Women	50 (54.9%)
Age, years, mean (SD)	65.2 (16.9)
Family status	
Single	6 (6.6%)
Married	70 (76.9%)
Divorced/widowed	15 (16.5%)
District	
Jerusalem	31 (34.1%)
Central	18 (19.8%)
Northern	29 (31.9%)
Southern	13 (14.3%)
Main reason for CBHH	
Infectious disease	66 (72.5%)
Other	25 (27.5%)
Questionnaire completed by	
Patient	43 (47.3%)
Caregiver	48 (52.7%)
CBHH = community-based home hospitalization, SD = standard deviation	

Table 2 presents the means of the PROMIS questionnaire domains. The mean of physical health for all patients was 39.1 (SD, 11.4) and the mean of mental health was 45.2 (SD, 12.6).

Table 2. Summary of PROMIS questionnaire results

PROMIS domain	Study population N=91			
	Mean	SD	Actual range	Possible range
Physical health	39.1	11.4	19.9-67.7	16.2-67.7
Mental health	45.2	12.6	21.2-67.6	21.2-67.6
Q6 (global 9r)	2.6	1.6	1-5	1-5
SD=standard deviation				

Analysis of the physical and mental health domains of the PROMIS questionnaire by participants' age (Table 3) showed that both mean physical and mental health were

statistically significantly higher in participants younger than 55 years compared to those 55 years of age or older ($p < 0.0001$ for both). Hence, younger patients in CBHH perceive their well-being as better than older patients.

Table 3. Comparison of the perceived physical and mental health of the study participants by age

PROMIS domain	<55 years N=19		≥55 years N=72			P value
	mean	(SD)	mean	(SD)	t(89)	
Physical health	46.4	(12.4)	37.2	(10.3)	3.32	<0.001
Mental health	54.1	(12.6)	42.9	(11.6)	3.67	<0.001
SD=standard deviation. P value by two-sample T-test for independent sample						

Analysis of the physical and mental health domains of the PROMIS questionnaire by participants' marital status (Table 4) showed that mean perceived physical health was statistically significantly higher in married participants compared to participants who were single, divorced or widowed ($p < 0.05$) while the difference in mean perceived mental health between married participants and those who were single, divorced or widowed only showed a trend for statistical significance ($p = 0.076$).

Table 4. Comparison of the perceived physical and mental health of the study participants by marital status

PROMIS domain	Married N=70		Single/divorced/widowed N=21			P value
	mean	(SD)	mean	(SD)	t(89)	
Physical health	40.6	(11.5)	34.0	(9.3)	-2.41	<0.05
Mental health	46.5	(12.7)	40.9	(11.8)	-1.79	0.076
SD=standard deviation. P value by two-sample T-test for independent samples						

Analysis of the physical and mental health domains of the PROMIS questionnaire by participants' residential district (Table 5) showed that mean perceived physical and mental health were statistically significantly higher in participants living in the central districts of Israel compared to those living in peripheral districts ($p < 0.022$ for both)

Table 5. Comparison of the perceived physical and mental health of the study participants by residential district

PROMIS domain	Central* N=49		Peripheral** N=42		t(89)	P value
	mean	(SD)	mean	(SD)		
Physical health	41.6	12.5	36.2	9.2	- 2.34 *	0.022
Mental health	48.0	13.3	41.9	11.1	-2.34 *	0.022
SD=standard deviation. P value by two-sample T-test for independent samples						
*Jerusalem and Central districts; **Northern and Southern districts						

Analysis of the physical and mental health domains of the PROMIS questionnaire by participants' hospitalization reason (Table 6) showed no difference in mean perceived physical health, but mean perceived mental health was statistically significantly higher in those hospitalized for infection compared to those hospitalized for other reasons ($p = 0.046$).

Table 6. Comparison of the perceived physical and mental health of the study participants by reason for CBHH

PROMIS domain	Infection N=66		Other reason N=25		t(89)	P value
	mean	(SD)	mean	(SD)		
Physical health	39.9	(11.6)	36.8	(10.6)	1.16	0.249
Mental health	46.8	(12.5)	40.9	(12.3)	2.02	0.046

SD=standard deviation. P value by two-sample T-test for independent samples

Multiple linear regression was utilized to examine the relative contribution of sex, age, marital status, residential district and hospitalization reason on physical health (Table 7). The explained variability was $R^2=19.2\%$, $p=0.002$, when age and marital status were found significant. Hence younger and married participants had better perceived physical health. The expected physical health perception of patients facing home hospitalization based on their demographic data, and the reason for hospitalization can be calculated by the following equation: $42.3 + (0.62 * \text{Sex}) - (0.2 * \text{Age}) - (2.54 * \text{hospitalization reason (infection/other reason)}) + (6.22 * \text{marital status (not married/married)}) + (2.82 * \text{residential district (not central/central)})$.

Table 7. Multiple linear regression for physical well-being by sex, age, family status, living place and hospitalization reason

Physical health	B	SE B	Beta	P value
Sex	0.62	2.34	0.027	0.791
Age	-0.20	0.07	-0.293	0.004
Hospitalization reason	-2.54	2.59	-0.100	0.331
Marital status	6.22	2.75	0.232	0.026
Residence	2.82	2.37	0.124	0.237

Multiple linear regression was utilized to examine the relative contribution of sex, age, marital status, residential district and hospitalization reason on perceived mental health (Table 8). The explained variability was $R^2=28.5\%$, $p<0.001$, when age and hospitalization reason were found significant. Hence younger participants and those hospitalized due to infection had better perceived mental health. The expected mental health perception of patients facing home hospitalization based on their demographic data, and the reason for hospitalization can be calculated by the following equation: $58.3 - (1.18 * \text{Sex}) - (0.32 * \text{Age}) - (5.54 * \text{hospitalization reason (infection/other reason)}) + (4.51 * \text{marital status (not married/married)}) + (2.2 * \text{residential district (not central/central)})$

Table 8. Multiple linear regression for physical well-being by sex, age, family status, living place and hospitalization reason

Mental health	B	SE B	Beta	P value
Sex	-1.18	2.45	-0.047	0.630
Age	-0.32	0.07	-0.433	<0.001
Hospitalization reason	-5.54	2.72	-0.197	0.045
Marital status	4.51	2.89	0.151	0.122
Residence	2.20	2.48	0.089	0.377

Discussion

The findings indicate that there several factors contribute to the perceived general well-being of patients in CBHH in Israel. The first factor is patients' age. The study's finding showed that the perceived health and general well-being of patients in CBHH declines with increasing age. These findings are in line with the Israeli Central Bureau of Statistics' report, which showed that 95.3% of those aged 20-44 and 80.7% of those aged 45-65 report a very good or good state of health, whereas among those aged 65 and older, only 56.6% report a very good or good state of health (CBS, 2019). The proportion of people who assess their health condition as very good or good diminishes with age. Negative age-related attitudes have a strong influence on people in early old age, when they have yet to form a self-identity and a sense of belonging to an older age group. Therefore, addressing these age groups who are not yet defined as "elderly" but are no longer young is particularly significant, with the aim of promoting higher perceived personal well-being (Khalaila, 2013). The need to assess and promote perceived quality of life in older age is reinforced by repeated research findings that improving self-perceived health in older age might lead to improved quality of life and reduced morbidity and mortality (Cesari et al., 2008; Ford et al., 2008).

Our results also show that marital status affects patients' perception of general well-being in CBHH, with married participants reporting better perceived mental and physical health. This may be explained by the fact that people living alone must see to their own basic physical needs independently, and may finds themselves lonelier and reliant on visits by friends and family, while married people have constant physical, social, and emotional support and thus experiences the crisis period of the hospitalization more positively. Studies on the association between marriage, spousal relations, and living with a spouse have showed that married people have higher subjective perceived personal well-being (Mikucka, 2016; Stutzer & Frey, 2006). Married people who share a long-term intimate relationship, friendship, and daily contact, tend to be happier than unmarried ones and feel that the relationship provides them with emotional and social support that helps them handle stressful and crisis events that might be a threat to their well-being (Nelson-Coffey, 2018). The negative health consequences of social isolation find powerful expression, especially among those most in need of support, such as older people or isolated groups on the margins of society (Cacioppo & Hawkey, 2003). Recognition of the health outcomes of loneliness is important in the management and development of tailored intervention programs for the prevention and reduction of negative outcomes of loneliness, such as low perception of general well-being among CBHH patients living alone.

Another major finding is the association between residential district and perception of general well-being in CBHH. An explanation for this finding can be found in the differences in the level of accessibility to services in general and medical services, in particular between the center of the country and the periphery, The literature supports this finding and relates to the topic of disparities and inequality in health services between groups within the same country. When examining inequality in health systems around the world, place of residence is an important field of influence. The World Health Organization has defined inequality in health as an international problem and conducts measurement,

monitoring, and reflection in countries in order to form standards for reducing inequality between population groups (Hosseinpoor et al., 2015). In Israel there is a national focus on inequality in access to health services, with one of the main areas being the comparison between the state of health in peripheral areas and in the center of the country. It is evident that when comparing the periphery and the center regarding health issues such as life expectancy, infant mortality, and risk factors for chronic morbidity, there are differences between those living in the center and in the periphery, indicating a lower level of health in the periphery. Another important measure examined is self-evaluation of one's health. Current surveys found that the proportion of those reporting a good state of health is higher in towns located in central Israel than in peripheral areas (CBS, 2019). The Israeli government is producing positive incentives for community health services to reduce inequality in health and expects community-based health services to initiate programs to reduce gaps between groups, with an emphasis on programs to reduce health gaps in peripheral societies. Reducing inequality in public policy is a social goal in itself and is especially important in cases where the system can reduce differences between different groups, which are perceived as unfair, through tailored management. Actions aimed at reducing and preventing inequality should be a key component of public health policy. Low perceptions of general well-being can adversely affect treatment outcomes and cause a bias in CBHH outcomes among patients living in different areas. Hence, it can be estimated that in the absence of adapted CBHH models for the periphery, the perception of well-being of CBHH patients living in the periphery will continue to be low and may adversely affect the health outcome of CBHH.

Additional finding addresses the association between the diagnosis of patients in CBHH and patients' perception of their health. The research results show that research participants treated in CBHH due to the diagnosis of an infectious disease perceived their mental well-being as better than did patients who received the service due to other diagnoses. No conspicuous differences were found in the perception of one's physical well-being between the group treated in CBHH due to diagnosis of an infectious disease and the group treated in CBHH due to other diagnoses. The range of diagnoses suitable for acute home hospitalisation is very wide. Target diagnoses include, among others, urinary tract infections as well as infectious diseases that require lengthy care, such as pneumonia, osteomyelitis, endocarditis, complicated diverticulitis, and cellulitis (Casteli et al., 2020; Cotton et al., 2000; Donald et al., 2005; McCarthy et al., 2015; Mendoza et al., 2009; Otero et al., 2010; Patel et al., 2008; Simpson et al., 2019). Other medical conditions suitable for home care include patients with deterioration of chronic illnesses such as heart failure, stroke, pulmonary embolism, chronic obstructive pulmonary disease (COPD), psychiatric disease (Barker et al., 2021; Caplan et al., 2012; Casteli et al., 2020; Corral Gudino et al., 2017; Corwin et al., 2005; Davies et al., 2000; Dowell et al., 2018; Echevarria et al., 2016; Goncalves-Bradley et al., 2017; Huntley et al., 2017; Jeppesen et al., 2012; Otero et al., 2010; Qaddoura et al., 2015; Ram et al., 2004; Richards et al., 2005; Shepperd et al., 2009; Shepperd et al., 2008; Shepperd & Iliffe, 1998; Shepperd et al., 2016; Wolter et al., 2004), . Cancer, including children with cancer and patients undergoing therapeutic treatment (Cool et al., 2018; Hansson et al., 2011; Hansson et al., 2013; Massano et al., 2020), and end-of-life patients (Shepperd et al., 2021).

Despite the extensive literature on medical conditions suitable for CBHH, there is a lack of research literature on aspects relating to the type of diagnoses in CBHH and

patients' health perception, and the effects these have on managing CBHH. Therefore, this finding is presented as an innovation of the current study. This finding can be explained because patients with a diagnosis of infectious disease are most often healthy people who are on CBHH due to the current acute illness that requires treatment but has no long-term consequences for their health and is not accompanied in the long term. In contrast, patients suffering from a chronic disease, such as heart disease or chronic lung disease, suffer from symptoms of the chronic disease on a permanent basis, so it is not surprising that even when treating an acute problem, their perceived mental well-being is lower. As for the perception of physical well-being, the study included people who were ill with an acute illness at the time, when even healthy people generally felt worse.

The linear regression conducted supports the hypotheses that married and younger patients enjoy better perceived physical well-being. At the same time, younger patients and those hospitalized with infectious diseases also perceive their mental well-being as good compared to older patients and those hospitalized in CBHH for other reasons. Since the explained variance in the regression equations were relatively low (19% and 28% for physical and mental health perception, respectively), there may be other significant variables that affect the sense of general well-being that were not included in this study. Other limitations of the study include its relatively small sample size, its cross-sectional design, which only allows to view the results in a specific point in time, its sampling method and self-report nature. The reason for choosing a convenience sample as an appropriate method for this study is the planned duration of the study. Nevertheless, this did not come at the expense of a representative sample in terms of the residential districts of the study participants, their age and gender. The advantages of the method are the simplicity of sampling and programming for data collection in a short time (Creswell & Creswell, 2018; Saunders et al., 2012). The possibility exists that in cases in which care givers completed the questionnaires, they may have affected the patient's responses.

Conclusions

The findings offer useful insights for the planning and delivery of appropriate CBHH services. Particular attention should be paid to older patients, living on their own in peripheral areas of the country. The limitations of the study relate to the examination of additional variables that may affect the well-being of patients in CBHH. Since in this study the variance explained in the regression equations was relatively low (19% and 28% for perceived physical and mental health, respectively), other significant variables that were not tested in this study may affect the overall sense of well-being.

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