RESEARCH AND THEORY

Indicators of an Integrated Home Care Model Shaped by the Needs of Patients Discharged from the Emergency Department

Katarzyna Szwamel* and Donata Kurpas†

Introduction: Developing community care models aims to satisfy the needs of patients’ in-home care comprehensively. This is crucial to decrease adverse events and prevent rehospitalization.

Methods: A cross-sectional study was conducted among 200 emergency department patients (EDPs) and 200 general practice patients (GPPs). The modified version of the Camberwell Assessment of Need Short Appraisal Schedule (CANSAS), the Health Behavior Inventory (HBI), the Generalized Self-Efficacy Scale (GSES), the Patient Satisfaction Questionnaire (PSQ), and the Multidimensional Health Locus of Control Scale (MHLCS) were used.

Results: The study indicated the higher level of unmet needs in EDPs than in the population of GPPs (p = 0.008). The unmet needs increased risk of hospitalization in both groups: OR = 0.28 [95%CI 0.15–0.52] for EDP and OR = 0.33, [95%CI 0.17–0.62] for GPPs groups. We also found a significant relationship between the low levels of needs satisfaction and social-demographic variables, including health profile and the level of health behavior, generalized self-efficacy, health locus of controls, and healthcare measures in general practice.

Discussion and Conclusion: We suggest that the identified factors should be included into the integrated community care model to advance satisfaction of patients’ needs, especially in patients discharged from an emergency department.

Keywords: delivery of health care; integrated care; emergency service; social environment; social support; socioeconomic factors

Introduction

Background

The growing burden of chronic diseases, patients experiencing fragmented care, and increasing demand for coordination across providers in the health and social sector correlates with the need for the integration of care. The starting point in developing an integrated care strategy should be identifying and assessing population needs [1].

Models of integrated care may enhance patient satisfaction, increase the perceived quality of care, and enable access to services [2]. The term ‘new models of care’ refers to a wide range of interventions aiming to address issues of integration across healthcare and between health and social care. Improved discharge planning and flow of care, and improved sharing of knowledge between practitioners, are essential components of new models of integrated care [3]. Discharge of the patient from the hospital to the community is critical in patient care, especially for patients with multiple comorbidities, elderly patients, or those with impaired function. Inappropriate discharge destination and incomplete communication with patients and ambulatory care can lead to adverse outcomes (e.g., emergency department [ED] visits and adverse events) [4]. Previous studies have shown that the rate of adverse events among home care patients is between 10% and 13%. The most common adverse events were falls, wound infections, psychosocial, behavioral or mental health problems, and adverse outcomes from medication errors. Between 32% and 56% of adverse events are preventable [5]. Achieving this goal is possible by ensuring safe, high-quality healthcare at the patient’s home. Home care decreases costs improves health outcomes and is connected with high levels of patient satisfaction [6]. Hence, the patient should receive in-home healthcare with simultaneous activities focused on the needs of patients and their families.

The notion of ‘need’ in healthcare is defined as the capacity to benefit. If health needs are to be identified, an effective intervention should be available to meet these

* Institute of Health Sciences, Univeristy of Opole, Opole, PL
† Department of Family Medicine, Wroclaw Medical University, Wroclaw, PL
Corresponding author: Katarzyna Szwamel (k.swamel@interia.pl)
needs and improve health [7]. Unmet needs are defined as “the difference between services judged necessary to deal appropriately with health problems and services actually received” [8]. Herr et al. (2014) claim that unmet healthcare needs are situations in which a participant needed healthcare but did not receive it [9]. An unmet need, as opposed to a met need, indicates a serious problem that was not effectively targeted in treatment [10]. Unmet needs may worsen the participant’s quality of life [11], increase the risk of hospital admissions and readmissions [12], and increase the risk of mortality [13].

Unmet needs are also an independent predictor of ED visits [14]. An especially high level of needs may be observed in people who are 65 or older and have at least 3 chronic diseases (high-need patients). The Commonwealth Fund Survey shows that one-fifth of patients with a high level of needs report to the ED with health problems that could be treated at the outpatient level. This is likely to be the result of experiencing fragmentary care [15]. The coordination of care of “high-need” patients, however, requires an objective and complex evaluation of needs. Such evaluation allows identification of patients and groups requiring actions targeted at prevention and early intervention, quantifying the unmet needs that enable adequate allocation of resources, and a direct indication of the necessary resources [16]. In coordinated healthcare systems, the evaluation of all the social, psychological, and healthcare needs and the needs concerning the organization of life falls within the responsibilities of the care coordinator [17, 18].

Previous studies have shown that satisfying patients’ needs can result from both the healthcare system (accessibility, acceptability, and availability) and individual approaches and characteristics of patients [19]. The factors determining the level of needs of patients include functional restrictions, the occurrence of mental illnesses (e.g., anxiety, depression, and bipolar disorder), multimorbidity, sociodemographic factors (patient’s age, gender, income, and education), indicators of the quality of care (i.e., relationships with the general practitioner [GP], availability of general and specialist care, the complexity of care, and support from a care coordinator) as well as the type of insurance [20, 21].

Problem Statement
The development of community care model that aims to comprehensively satisfy the needs of patients’ in-home care is crucial to decrease adverse events and prevent readmission, including at the ED. It should describe integrated actions within the scope of health and social care to those patients based on the appropriate care measures. Therefore, we suggest the development of a holistic model of care which would specify the level of needs of patients in connection to their sociodemographic profile, level of health behavior, perception of the quality of the services offered by the general care, as well as patients’ individual convictions and expectations of health and social care. Note that ED in Poland is a part of the State Medical Rescue System (SMRS), which includes hospital emergency departments, medical emergency teams, including airborne medical emergency teams. The SMRS system can cooperate with trauma centers and hospital departments to treat sudden health and life-threatening conditions.

Since 1991 Poland has experienced a progressive disintegration of the social care and healthcare systems, being supervised by the government with two separate ministries. This policy has led to the loss of the connection between the physician and the division of social care workers [22]. Thus, the development of effective community care models and identification of their relevant socioclinical factors is especially crucial for Polish patients.

 Undertaking an integrated health and social care policy should be based on objective data. The study assumed that the identification of needs requiring the satisfaction of a patient discharged from ED, quantification of the level of dissatisfaction in particular areas with the use of standardized tools, and identifying factors determining their satisfaction would allow developing a model of community care. The application of such a model in-home care will allow for personalized adjustment of health and social services to a given patient and more effective use of limited material, human and financial resources of both sectors mentioned above, aimed at a given need.

The research aimed to determine and compare: (1) the level of unmet needs in a group of ED patients and a group of general practice patients; (2) factors determining the level of unmet needs as elements of an integrated model of community care for a patient discharged from the ED; and (3) the chances of hospitalization in both groups depending on the level of satisfaction of the need.

Research Methods
Study Design
Cross-sectional, observational studies were carried out among the inhabitants of the Kędzierzyńsko-Kozielski district (Opolskie Voivodship, Poland).

Setting
The research was carried out between 2014 and 2016 after obtaining the consent of the Bioethics Committee at the Wroclaw Medical University (approval no. KB-87/2016) while maintaining the requirements of the Declaration of Helsinki of 1975 (amended in 2000) and Good Clinical Practice. Two groups of patients were examined. Both groups were chosen from the same population and monitored simultaneously (parallel groups). One group consisted of patients from the Emergency Department of the hospital in Kędzierzyn-Koźle (the ED group). The other group consisted of patients from four different general practice clinics, including two clinics in cities and two in villages (the GP group) in the Kędzierzyńsko-Kozielski district (Opolskie Voivodship, Poland). The method of random selection was applied to both groups of patients.

Participants
The patients included in the study were over 18 years old, verbally responsive, provided informed consent to participate in the study, and were native speakers of Polish. Being
an ED patient in the case of the study group and being a
general practice patient in the control group was the basic
criterion of inclusion in each group. The following people
were excluded from the study: people under 18 years old,
those without logical contact, people who were not users
of the Polish language, and people who did not consent to
take part in the study, as well as patients with difficulties
which made participation in the study impossible (e.g., vis-
ual disorders reported by the patient, foreign objects in the
eye, severe trauma, or patients in a critical condition). Par-
ticipation in the study was offered only to those patients
who fulfilled the criteria for inclusion in the study.

**Study Size**

In the early stages, an invitation to participate in the study
was accepted by 445 randomly chosen ED patients and
280 randomly chosen general practice patients. The study
was carried out by nurses employed in the studied clinics.
They were previously trained in the way the study was car-
ried out.

**Variables**

The following categories of variables were distinguished:

i. The level of patients’ needs: Camberwell Index (CI).

ii. Sociodemographic variables (age, gender, the
financial status of the family, the number of people
living in one household, place of residence, marital
status, relationship status, and the distance from the
place of residence to the general practice and ED).

iii. Variables determining the health profile and the
level of health behavior of the study participants
i.e. treatment of chronic diseases, the number of
medicines taken continually per day, treatment in a
specialist clinic, the number of all hospitalizations
within the last 3 years, the number of hospitalizations
at an ED within the last 3 years, body mass index
(BMI), systolic blood pressure, diastolic blood
pressure, results of laboratory tests (International
Normalized Ratio [INR]: creatinine, serum glucose
concentration), general indicator of health behavior
(HB), an indicator of healthy eating habits (HEH), an
indicator of preventive behavior (PB), an indicator
of positive psychical mental attitude (PMA), and an
indicator of health practices (HP).

iv. Variables connected with the quality of healthcare
provided by the personnel of general practice: the
level of satisfaction of care provided by the general
practice personnel, execution of home care by the
GP, health education provided by the general practice
team, and perception of the GP as a continuator of
treatment (continuity of care).

v. Variables connected with beliefs and expectations
of patients: General Self-Efficacy Scale (GSES), the
positioning of health surveillance in the dimension
“internal control” (MHLC-W), the positioning of
health surveillance in the dimension “the influence
of others” (MHLC-I), and the positioning of health
surveillance in the dimension “case” (MHLC-P).

**Data Sources**

The Camberwell Assessment of Need Short Appraisal
Schedule (CANSAS), the Health Behavior Inventory (HBI),
the General Self-Efficacy Scale (GSES), the Patient Satis-
faction Questionnaire (PSQ), and the Multidimensional
Health Locus of Control Scale (MHLCs) and the question-
aire developed by the authors for sociodemographic and
clinical data were used.

INR values were obtained using Dade Innovin Reagent.
The proceedings were carried out according to the World
Health Organization and the International Committee of
Thrombosis and Hemostasis. Levels of blood serum cre-
atinine were obtained by means of an enzymatic test on
the Beckman Coulter AU machine. Glucose marking was
carried out by means of the colorimetric method with
glucose oxidase and the application of the Liquick Cor-
GLUCOSE diagnostic set. Blood pressure was determined
by means of a clock blood-pressure monitor TM-Z made
by TechMed. Height and weight were measured using col-
umn scales (Seca 711) and a measuring rod (Seca 220; EN
4551).

The CANSAS was applied to evaluate the needs of ED
and general practice patients (Cronbach’s alpha: 0.82).
The modification of CAN (Camberwell Assessment of
Needs) is focused on 22 problem fields. It evaluates the
medical, psychological, environmental, and social needs
of the patient. In this research, the Camberwell Index was
calculated. The calculations consisted of the determina-
tion of the number (N) of met (1) and unmet (0) needs
of the patient on the basis of 24 questions identifying 22
needs. Consecutively, within the (N) of needs indicated
by the studied person, the number (M) of met needs (1)
was established. The M/N formula was used to calculate
the Camberwell Index. According to the Camberwell Index,
lower average values indicate a low level of met needs,
whereas higher average values indicate a high level of met
needs [23].

The HBI consists of 24 statements and measures four
categories of health behavior: healthy eating habits (HEH),
positive mental attitude (PMA), preventive behavior (PB),
and health practices (HP). Patients were asked to evaluate
the frequency of activities connected with health accord-
ing to a five-grade scale in which “1” meant “hardly ever,”
2 “rarely,” 3 “from time to time,” 4 “often” and 5 “almost
always.” The value of the general indicator of health
behavior is within the range of 24–120 points. The higher
the value of the indicator, the better the health behavior.
Cronbach’s alpha is 0.85 [24].

The PSQ focuses on the care provided by general prac-
tice personnel was created based on the EUROPEP ques-
tionnaire [25], the Medical Interview Satisfaction Scale
[26], the Quality Assurance Program Questionnaire of the
Columbia Medical Plan, U.S. [27], and the Questionnaire
for Patients’ of the American Society of Internal Medicine,
Family Practice Clinic – patient satisfaction questionnaire
from the University of Oregon [28]. The internal cohesion
(Cronbach’s alpha) is 0.94. The questionnaire consists of
modules concerning patient’s subjective and objective
impressions during the appointment, the cooperation of
the physician with the patient during the diagnostic procedures and treatment, psychosocial factors (e.g., interest in the patient's material and personal situation, providing information about cheaper medication), the possibility to obtain the physician's help in urgent situations, and contact with other members of staff of the general practice [29, 30]. Patients received 2 points if they answered "yes," 1 point if they answered "sometimes," and 0 points if they answered "no." The study participant could obtain a score from 0 to 72 points, with higher scores indicating a higher level of patient satisfaction. Two levels of satisfaction were assumed: high (for values above the median) and low (for values equal to or lower than the median).

The GSES measures the strength of the individual's general conviction about the effectiveness of dealing with difficult situations and obstacles. The task of the study participant is to choose the answer by circling it according to a scale in which 1 means "no," 2 "probably not," 3 "probably yes," and 4 "yes." The sum of the responses provides the general self-efficacy indicator. The result falls within 10 and 40 points. The more points, the higher the feeling of self-efficacy. Internal cohesion measured with Cronbach's alpha is 0.85 [24].

The MHLCS consists of 18 statements and covers convictions concerning the expectations in 3 dimensions of health surveillance positioning: Internal (I) – control over one's own health depends on the study participant; the influence of others (O) – one's own health is the result of the influence of others, especially the medical personnel; accident (A) – one's own state of health is governed by accident. Every sub-scale consists of six statements. The study participant rated each statement from 1 to 6 points, in which 1 means "I absolutely disagree," 2 "I disagree to some extent," 3 "I disagree to a small extent," 4 "I agree to a small extent," 5 "I agree to some extent," and 6 "I absolutely agree." The range of results is from 6 to 36 points. The higher the result, the stronger the conviction about the influence of one factor on their state of health.

**Statistical Analysis**

The measure of average distribution was calculated for quantitative variables, while for qualitative variables, cardinality and interest were determined. In this study, qualitative variables were all observable qualities and characteristics of a sample population: gender, place of residence, marital status, relationship status, education. Qualitative data were presented in the form of the numbers (n) and percentages (%). The normality of the distribution of quantitative variables was determined using the Shapiro-Wilk test.

The Chi-square test was applied to verify the probability and differences between the structure indicators in both groups and to verify the similarities and differences between the groups for categorical features when the number of categories was larger than 3. When the number of categories was less than or equal to 3, Fisher's exact test of independence was used.

Wilcoxon's many-one rank test was used to test the relevance of differences between the median values of Camberwell Indexes for the ED and GP groups.

The Rho Spearman's ratio was applied to determine the study strength and direction of correlation in variables influencing the level of meeting patient needs. The strength of the dependence was interpreted according to the following scheme: $|r| \geq 0.9$ – very strong dependence, $0.7 \leq |r| < 0.9$ – strong dependence, $0.5 \leq |r| < 0.7$ – average dependence, $0.3 \leq |r| < 0.5$ – weak dependence, $|r| < 0.3$ – very weak dependence [30].

Correspondence analysis was used to establish the variables which appear most frequently with high and low levels of meeting patients’ needs. Only those variables which correlated on a statistically significant level with the given category were chosen for the correspondence analysis. The values were deemed high if they were higher than the median, whereas values lower than or equal to the median were considered low.

Logistic regression was used to investigate the probability of hospitalization. The median Camberwell Index values were employed to calculate the hospitalization chances of ED and GP groups.

**Results**

**Participants**

Out of 445 patients, 200 were eligible to be included in the ED group. In the GP group, out of 280 distributed surveys, only 200 were correctly filled in. The reasons for excluding patients from the study at each stage are represented in Figure 1.

**Descriptive Data**

There were no significant differences between the ED and GP groups in terms of age, the number of people living in one household, the distance from the place of residence to the general practice, and the distance from the place of residence to the ED. The groups did not differ in their gender, education, marital status, the financial status of the family, and life in a stable relationship. There was a difference between the ED and GP groups for the size of the place of residence ($p = 0.031$) (Table 1).

**Main Results**

**The Level of Unmet Needs**

ED patients showed a lower level of needs satisfaction than the GP group (the mean Camberwell Indices were $M = 0.75$ and $M = 0.80$, $p = 0.008$) (Table 2).

In the ED group, unmet needs were observed in the following areas: “Having children” – 69.23% (27/39) of patients had no children but would like to have them; “medication” – 62.94% (124/197) used prescribed medication; and “psychological stress” – 57.81% (111/192) experienced psychological stress (Table 3).

For the GP patients, the strongest positive correlation with the level of needs satisfaction was observed with the following variables: positive mental attitude, the general sum of increase of health behavior, general self-efficacy, healthy eating habits, general indicator of patient’s satisfaction with services, preventive behavior, the financial status of the family (in people with very good, good and average financial status a high level of needs satisfaction was observed in comparison with people with bad and
very bad financial status), and education (in people with secondary and higher education a higher level of needs satisfaction was observed than in people with primary or vocational education) (Table 4).

The following variables showed a significant negative correlation with the level of needs satisfaction in the GP patients: the number of medication taken regularly per day, the positioning of health surveillance in the dimension "accident," the number of hospitalizations at the ED within the last 3 years, living in a stable relationship (people who did not live in a stable relationship more rarely obtained a high level of meeting needs than people who lived in a stable relationship), the general number of hospitalizations within the last 3 years, the number of chronic diseases, age, and gender (women obtained a high level of meeting needs more often than men) (Table 4).

For the ED patient group, the following variables correlated significantly with patient needs: the internal health locus of control, no treatment for chronic diseases, no treatment in a specialist clinic, education (people with secondary and higher education had higher levels of met needs than people with primary or vocational education), financial status (people with very good, good and average financial status were more satisfied with needs than people with bad and very bad financial status), and general feeling of self-efficacy (Table 4).

The following variables negatively correlated with the levels of met needs in the ED patient group: the number of chronic diseases, the number of medications taken regularly per day, the INR results, the general number of hospitalizations within the last 3 years, living in a stable relationship (people who did not live in a stable relationship more rarely obtained a high level of meeting needs than people who had stable relationships), age, the number of hospitalizations at the ED within the last 3 years, the health locus of control on the dimension “accident,” BMI, creatinine level, glucose concentration, marital status (a high level of meeting needs appeared less often in divorced and widowed people), and systolic blood pressure (Table 4).

Factors Determining the Level of Needs Satisfaction: Correspondence Analysis

In both groups, the high levels of needs satisfaction (above the median) more often co-occurred with the following variables:

i. sociodemographic factors: patients aged below or equal to the median (AGE–) – GP group Me = 49.00 years, min–max = 18–87 vs. ED group Me = 45.00, min–max = 18–95 years; female gender (GENf); secondary and higher education (EDU+); marital status – married (MAR+); number of people living in a household above the median (NPH+) – in the GP group Me = 3, min–max = 1–7 vs. ED group Me = 3, min–max = 1–8; good and very good material status

Figure 1: The scheme of the selection of study participants in ED and GP groups.
of families (MAT+); and life in a stable relationship (LSR+).

ii. the health profile and level of health behaviors: lack of chronic diseases (CHD–); high values of positive mental attitude (PMA+) – GP group $Me = 3.50$, min–max = 1.17–5.00 vs. ED group $Me = 3.50$, min–max = 2.00–5.00; BMI values at a level lower or equal to the median (BMI–) – GP group $Me = 25.87$, min–max = 15.78–55.56 vs. ED group $Me = 27.32$, min–max = 16.26–66.02; the number of chronic diseases

Table 1: Structure indicators in ED and GP groups according to one feature of discrete variables.

| Feature               | GP          | ED          | Total       | Test        |
|-----------------------|-------------|-------------|-------------|-------------|
|                       | n  | %  | n  | %  | n  | %  | Chi$^2$ | df | p   |
| Gender                |    |    |    |    |    |    |         |    |     |
| Female                | 117 | 58.5 | 99 | 49.5 | 216 | 54.0 | 2.91   | 1  | 0.087 |
| Male                  | 83  | 41.5 | 101| 50.5 | 184 | 46.0 |         |    |      |
| Total                 | 200 | 100.0| 200| 100.0| 400 | 100.0|         |    |      |
| Education             |    |    |    |    |    |    |         |    |     |
| Primary               | 14  | 7.1  | 17 | 8.7  | 31  | 7.9  | 1.85   | 3  | 0.074 |
| Vocational            | 47  | 24.0 | 53 | 27.0 | 100 | 25.5 |         |    |      |
| Secondary             | 88  | 44.9 | 89 | 45.4 | 177 | 45.2 |         |    |      |
| Higher                | 47  | 24.0 | 37 | 18.9 | 84  | 21.4 |         |    |      |
| Total                 | 196 | 100.0| 196| 100.0| 392 | 100.0|         |    |      |
| Marital status        |    |    |    |    |    |    |         |    |     |
| Unmarried             | 47  | 23.7 | 41 | 20.8 | 88  | 22.3 | 6.95   | 3  | 0.074 |
| Married               | 116 | 58.6 | 116| 58.9 | 232 | 58.7 |         |    |      |
| Divorced              | 7   | 3.5  | 19 | 9.6  | 26  | 6.6  |         |    |      |
| Widowed               | 28  | 14.1 | 21 | 10.7 | 49  | 12.4 |         |    |      |
| Total                 | 198 | 100.0| 197| 100.0| 395 | 100.0|         |    |      |
| Financial status      |    |    |    |    |    |    |         |    |     |
| Very bad              | 2   | 1.0  | 0  | 0.0  | 2   | 0.5  | 7.83   | 4  | 0.098 |
| Bad                   | 9   | 4.6  | 14 | 7.2  | 23  | 5.9  |         |    |      |
| Average               | 84  | 42.6 | 102| 52.3 | 186 | 47.4 |         |    |      |
| Good                  | 93  | 47.2 | 71 | 36.4 | 164 | 41.8 |         |    |      |
| Very good             | 9   | 4.6  | 8  | 4.1  | 17  | 4.3  |         |    |      |
| Total                 | 197 | 100.0| 195| 100.0| 392 | 100.0|         |    |      |
| In a relationship     |    |    |    |    |    |    |         |    |     |
| Yes                   | 129 | 65.2 | 140| 72.5 | 269 | 68.8 | 2.15   | 1  | 0.142 |
| No                    | 69  | 34.8 | 53 | 27.5 | 122 | 31.2 |         |    |      |
| Total                 | 198 | 100.0| 193| 100.0| 391 | 100.0|         |    |      |
| Place of residence    |    |    |    |    |    |    |         |    |     |
| >100 000 inhabitants  | 12  | 6.0  | 15 | 7.5  | 27  | 6.8  | 8.86   | 3  | 0.031 |
| (city)                |    |    |    |    |    |    |         |    |      |
| 20 000–100 000         | 84  | 42.0 | 99 | 49.7 | 183 | 45.9 |         |    |      |
| (medium town)         |    |    |    |    |    |    |         |    |      |
| Less than 20 000       | 15  | 7.5  | 24 | 12.1 | 39  | 9.8  |         |    |      |
| (small town)          |    |    |    |    |    |    |         |    |      |
| Village               | 89  | 44.5 | 61 | 30.7 | 150 | 37.6 |         |    |      |
| Total                 | 200 | 100.0| 199| 100.0| 399 | 100.0|         |    |      |

Key: $n$ – cardinality, Chi$^2$ – chi-square test, $p$ – significance level, df – the number of degrees of freedom.

Table 2: The differences in ED and GP groups regarding the level of meeting needs.

| Variable                   | group | n  | M   | SD  | Me  | min | max  | test W | test SW |
|----------------------------|-------|----|-----|-----|-----|-----|------|--------|---------|
| Camberwell Index of Needs  | GP    | 200| 0.80| 0.15| 0.83| 0.33| 1.00 | 0.008  | <0.001  |
|                           | ED    | 200| 0.75| 0.19| 0.80| 0.21| 1.00 |        |         |

Key: $M$ – average, $Me$ – median, $SD$ – standard deviation, $min$ – minimum, $max$ – maximum, $W$ test: Wilcoxon’s many-one rank test for the difference between medians, SW test – Shapiro-Wilk test, $p$ – the calculated level of test significance, GP – general practice group, ED – emergency department group.
Table 3: Met/unmet needs of ED patients.

| No. | Needs                                          | Unmet (%) | Met (%) | Total (%) |
|-----|------------------------------------------------|-----------|---------|-----------|
| 1   | Accommodation                                  | 13 (6.50) | 187 (93.50) | 200 (100) |
| 2   | Food and grocery (shopping)                    | 34 (17.00) | 166 (83.00) | 200 (100) |
| 3   | Looking after the home                         | 30 (15.00) | 170 (85.00) | 200 (100) |
| 4   | Self-care at home                              | 33 (18.97) | 141 (81.03) | 174 (100) |
| 5   | Self-care at home                              | 33 (18.97) | 141 (81.03) | 174 (100) |
| 6   | Daytime activities                             | 72 (36.36) | 126 (63.64) | 198 (100) |
| 7   | Physical health                                | 74 (37.56) | 123 (62.44) | 197 (100) |
| 8   | Mental health                                  | 45 (33.83) | 88 (66.17)  | 133 (100) |
| 9   | Information on condition and treatment         | 18 (10.71) | 150 (89.29) | 168 (100) |
| 10  | Psychological distress                         | 111 (57.8) | 81 (42.2)   | 192 (100) |
| 11  | Drinking alcohol and problems associated with drinking | 17 (14.17) | 103 (85.83) | 120 (100) |
| 12  | Narcotics                                      | 7 (3.7%)   | 183 (96.3)  | 190 (100) |
| 13  | Medicines that aren't prescribed               | 124 (62.9) | 73 (37.06)  | 197 (100) |
| 14  | Social life                                    | 38 (19.7)  | 154 (80.2)  | 192 (100) |
| 15  | Intimate relationships                         | 49 (26.0)  | 139 (73.9)  | 188 (100) |
| 16  | Satisfaction with intimate relationships       | 36 (27.6)  | 94 (72.3)   | 130 (100) |
| 17  | Satisfaction with sexual life                  | 65 (35.7)  | 117 (64.2)  | 182 (100) |
| 18  | Need of having children                        | 27 (69.2)  | 12 (30.7)   | 39 (100)  |
| 19  | Satisfaction with relationship with children   | 12 (9.38)  | 116 (90.6)  | 128 (100) |
| 20  | Possibility of communication by phone          | 9 (4.59)   | 187 (95.4)  | 196 (100) |
| 21  | Possibility of using public transport          | 40 (20.7)  | 153 (79.2)  | 193 (100) |
| 22  | Ability of budgeting own money                 | 33 (17.1)  | 159 (82.8)  | 192 (100) |
| 23  | Getting all the money entitled to             | 25 (12.6)  | 172 (87.3)  | 197 (100) |

lower or equal to median (NCD–) – GP group Me = 1.00, min–max = 0.00–12.00 vs. ED group Me = 1.00, min–max = 0.00–10.00; the total number of hospitalizations over a 3-year period lower or equal to the median (NAH–) – GP group Me = 0.00, min–max = 0.00–10.00 vs. ED group Me = 1.00, min–max = 0.00–12.00; creatinine values at a level lower or equal to the median (CRE–) – GP group Me = 0.80 [mg/dl], min–max = 0.45–5.68 [mg/dl] vs. ED group Me = 0.85 [mg/dl], min–max = 0.38–4.04 [mg/dl]; systolic blood pressure lower or equal to the median (SBP–) – GP group Me = 130.00 mmHg, min–max; 90.00–190.00 mmHg vs. ED group Me = 130.00 mmHg; min–max = 90.00–230.00 mmHg; serum glucose concentration at a level lower or equal to the median (SCG–) – GP group Me = 99 [mg/dl], min–max = 50–357.70 [mg/dl] vs. ED group Me = 116.70 [mg/dl], min–max = 81.70–382.30 [mg/dl]; and high values of healthy eating habits (HEH+) – GP group Me = 3.17, min–max = 1.17 – 5.00 vs. ED group Me = 3.17, min–max = 1.17–5.00.

iii. quality of general healthcare measures: high level of patient satisfaction with GP services (SAT+) – in GP group Me = 52.50, min–max = 19–72 vs. ED group Me = 52.00, min–max = 18–72; GP visits at patients’ home (RHC+), providing health education by general practice doctors and nurses (PHE+), and perceiving the GP as a treatment continuator (GPC +).

iv. measures of patients’ beliefs and expectations: a high generalized sense of self-efficacy (GSE+) – GP group Me = 30.00, min–max = 10.00–40.00 vs. ED group Me = 31.00, min–max 13.00–40.00; a high level of locating health control in the internal dimension – higher than the median (MHLC-I +) – GP group Me = 25.00, min–max = 9.00–36.00 vs. ED group Me = 25.00, min–max = 9.00–36.00.

The correspondence analysis in the ED group showed that for the variable “the number of medications taken regularly per day” (NMPD +, NMPD –) the unambiguous interpretation of dependence was not possible (both NMPD + and NMPD – points were positioned closer to point CI–) or the GP group, the median values of the number of used medicines was 4 compared with 5 in the ED group.

The factors relevant to the integrated home care model shaped by GP patients’ needs are shown in Figure 2.

The Chances of Hospitalization As indicated by logical regression analysis, for GP patients with the Camberwell Index lower than 0.83, the chances of hospitalization were 3 (≈1/0.33) times higher than for patients with the index above 0.83 (OR = 0.33;
Table 4: The Spearman’s rank correlation ratio ($r$) for the dependence of the level of needs (Camberwell) from other variables in ED and GP patients group.

| Camberwell Index (CI) and variables listed below | Name of variable | GP $r_1$ | p1 | ED $r_2$ | p2 | GP n1 | ED n2 | $r_1 \neq r_2$? Analysis of correspondence |
|-----------------------------------------------|-----------------|---------|-----|-----------|-----|-------|-------|-----------------------------------------------|
| Sociodemographic variables                   |                 |         |     |           |     |       |       |                                              |
| Age                                           | AGE             | −0.17   | 0.015 | −0.32     | <0.001 | 200   | 199   | 0.113 | Yes                                          |
| Gender                                        | GEN             | −0.16   | 0.021 | −0.10     | 0.148  | 200   | 200   | 0.545 | Yes                                          |
| Education                                     | EDU             | 0.27    | 0.000 | 0.35      | <0.001 | 196   | 196   | 0.384 | Yes                                          |
| Marital status                                | MAR             | −0.06   | 0.407 | −0.19     | 0.008  | 198   | 197   | 0.192 | Yes                                          |
| The number of people living in one household  | NPH             | 0.24    | 0.001 | 0.22      | 0.002  | 199   | 198   | 0.835 | Yes                                          |
| The financial status of the family            | FSF             | 0.30    | <0.001 | 0.35      | <0.001 | 197   | 195   | 0.583 | Yes                                          |
| Life in a stable relationship                 | LSR             | −0.25   | <0.001 | −0.37     | <0.001 | 198   | 193   | 0.192 | Yes                                          |
| Place of residence                            | POR             | −0.02   | 0.800 | −0.06     | 0.427  | 200   | 199   | 0.691 | Yes                                          |
| Material status of families                   | MAT             | 0.30    | <0.001 | 0.35      | <0.001 | 197   | 195   | 0.583 | Yes                                          |
| Variables determining the health profile and the level of health behavior | | | | | | | | |
| Treatment of chronic diseases                 | CHD             | 0.10    | 0.150 | 0.40      | <0.001 | 200   | 200   | 0.001 | Yes                                          |
| The number of medication taken regularly per day | NMPD           | −0.38   | <0.001 | −0.41     | <0.001 | 111   | 96    | 0.802 | Yes                                          |
| Treatment in a specialist clinic              | TSC             | 0.18    | 0.012 | 0.38      | <0.001 | 199   | 199   | 0.031 | Yes                                          |
| The number of chronic diseases                | NCD             | −0.23   | 0.001 | −0.46     | <0.001 | 200   | 200   | 0.009 | Yes                                          |
| The number of all hospitalizations within last 3 years | NAH          | −0.24   | 0.001 | −0.39     | <0.001 | 200   | 200   | 0.097 | Yes                                          |
| The number of ED visits within the last 3 years | NEDV           | −0.26   | 0.014 | −0.31     | <0.001 | 86    | 200   | 0.677 | Yes                                          |
| Systolic blood pressure – mmHg:              | SBP             | −0.07   | 0.319 | −0.18     | 0.011  | 199   | 195   | 0.271 | Yes                                          |
| Diastolic blood pressure – mmHg:             | DBP             | −0.11   | 0.124 | −0.41     | 0.199  | 200   | 199   | 1.000 |                                               |
| INR                                          | INR             | −0.17   | 0.330 | −0.41     | 0.001  | 36    | 67    | 0.218 | Yes                                          |
| Serum glucose concentration                   | SGC             | −0.16   | 0.057 | −0.26     | 0.009  | 136   | 99    | 0.434 | Yes                                          |
| Creatinine                                    | CRE             | 0.01    | 0.952 | −0.27     | 0.002  | 102   | 132   | 0.032 | Yes                                          |
| BMI                                           | BMI             | −0.12   | 0.092 | −0.27     | <0.001 | 198   | 198   | 0.123 | Yes                                          |
| IZZ – the increase of health behavior (sum of points) | IZZ             | 0.49    | <0.001 | 0.17     | 0.020  | 187   | 179   | 0.001 |                                               |
| HEH – healthy eating habits                   | HEH             | 0.39    | <0.001 | 0.10     | 0.175  | 198   | 199   | 0.002 | Yes                                          |
| PB – preventive behavior                     | PB              | 0.33    | <0.001 | 0.10     | 0.168  | 194   | 190   | 0.018 | Yes                                          |
| PMA – positive mental attitude               | PMA             | 0.53    | <0.001 | 0.30     | <0.001 | 199   | 195   | 0.006 | Yes                                          |
| HP – health practices                         | HP              | 0.28    | <0.001 | 0.01     | 0.847  | 192   | 187   | 0.007 | Yes                                          |

(Contd.)
### Camberwell Index (CI) and variables listed below

| Name of variable | GP | ED | GP | ED |
|------------------|------------------|------------------|------------------|------------------|
| **Variables concerning the healthcare provided by the general practice personnel** | | | | |
| The level of patients' satisfaction with the care provided by the general practice personnel | SAT | 0.38 | <0.001 | 0.14 | 0.047 | 200 | 200 | 0.010 | Yes |
| Services of the general practice team – realization of house calls | RHC | 0.20 | 0.005 | 0.14 | 0.042 | 200 | 200 | 0.540 | Yes |
| Services of the general practice team – providing health education | PHE | 0.22 | 0.002 | 0.18 | 0.011 | 200 | 200 | 0.679 | Yes |
| Services of the general practice team – perceiving the GP as a treatment continuator (continuity of treatment) | GPC | 0.16 | 0.025 | 0.33 | <0.001 | 200 | 200 | 0.072 | Yes |
| **Variables concerning patients' convictions and expectations** | | | | |
| GSES – General self-efficacy | GSE | 0.44 | <0.001 | 0.35 | <0.001 | 200 | 195 | 0.292 | Yes |
| MHLC (I) dimension – internal control | MHLC-I | 0.00 | 0.990 | 0.40 | <0.001 | 193 | 196 | <0.001 | Yes |
| MHLC (O) dimension – influence of others | MHLC-O | −0.09 | 0.206 | 0.08 | 0.298 | 191 | 192 | 0.098 | Yes |
| MHLC (A) dimension – accident | MHLC-A | −0.29 | <0.001 | −0.31 | <0.001 | 195 | 193 | 0.830 | Yes |

**Key:** 
GSES – the level of general self-efficacy, GP – general practice, ED – emergency department, MHLC (I) – the positioning of health surveillance in the dimension “internal control,” MHLC (O) – the positioning of health surveillance in the dimension “influence of others,” MHLC (A) – the positioning of health surveillance in the dimension “accident,” INR – international normalized ratio, n1 and n2 – cardinality of observation in the GP and ED group respectively, r1 and r2 – Spearman’s rank correlation ratio in GP and ED groups, p1 and p2 – the level of significance of the test verifying the null hypothesis (r = 0) in reference to the alternative that it is other than zero (r ≠ 0), p3 – the level of significance of the test verifying the null hypothesis stating that the correlation ratio r1 and r2 are equal (r1 = r2) in reference to the alternative that it is other than zero (r1 ≠ r2).
The frequency of hospitalization in these groups was 49.0% and 24.0%, respectively (p < 0.001). Patients from the ED group with the Camberwell index lower than 0.80 had the chances of hospitalization 3.6 (≈ 1/0.28) times higher than patients with the index above 0.8 (OR 0.28, 95%CI 0.15–0.52). Percentages of hospitalization in these groups were 65.0% and 34.0%, respectively (p < 0.001) (Table 5).

**Discussion**

**Key Results**

The present study indicated that patients at the emergency department (ED) presented the lower satisfaction of needs than patients attending general practice (GP) (Table 2). We found that the level of needs satisfaction predicted the risk of hospitalization for both groups of patients. The important finding was that the chance of hospitalization was higher in the ED group than in the GP group (Table 5). Moreover, we have demonstrated that the level of satisfaction of patients’ needs was significantly determined by their socio-demographic factors, their health profile, their level of health behavior, general self-efficacy, health locus of control, and indicators of the quality of healthcare at the level of general practice (Table 4).

**Interpretation**

The detailed analysis of patient needs at the emergency department showed dissatisfaction with social contacts (having no children and poor satisfaction with their social life and relationship with their partner) as well as dissatisfaction with physical and mental health (e.g. difficulties with using public transportation, psychological stress, lack of satisfaction with one’s health state, and using non-prescribed medication) (Table 3).

The Significance of Sociodemographic Indicators for the Community Care Model

The present results from either ED or GP patients identified the risk factors for unmet patient needs: adults with age over 45 (ED) or 49 (GP), male gender, primary or vocational education, small households with less than 3 people, bad financial status, and unstable relationships. The consistent correlation patterns between these risk factors and patient needs were observed in the ED and GP groups (paragraph 3.3.3).

Recent reports are consistent in distinguishing factors that positively affect the satisfaction of patient needs: high level of income, high level of education, and young age. Lower socioeconomic status generally results in higher satisfaction of needs.
healthcare needs and more diverse health problems [33]. Other researchers also confirmed that poor education was associated with a higher risk of having unmet needs [34]. So far, the studies reporting the effects of “gender” remain undetermined to the end. Our findings suggest that male gender and unstable relationships belong to the risk factors for poor need satisfaction. The opposite results showed that unmet needs in the Greek patient population were more frequent and significantly higher among females, married individuals, people having children, and economically inactive [24]. Similarly, a Korean study showed that women with lower income and educational levels expressed unmet healthcare needs [35]. In the same vein, studies on unmet health care needs in the Serbian population identified that the higher level of satisfaction of needs was influenced by female gender, higher education, and higher levels of material status [55]. According to this Serbian report, the least probability to report unmet healthcare needs was predicted by female gender (OR = 0.81), higher education (OR = 0.77), and the highest level of material status (OR = 0.46) [35]. Similarly, Kim et al. (2015) showed that females were more likely to experience unmet needs as compared to males [34]. In the study by Ahn et al. (2013), older women (OR = 1.831, 95%CI = 1.428–2.347) were more likely to have unmet healthcare needs than older men [36]. These gender differences may be explained at some point by a particular country or geographical region, e.g., its culture, women’s rights, views on women’s employment, etc. It should be assumed that in connection with the demographic aging of European societies, older women will experience higher levels of unmet needs than men and will require more medical, psychological, and social support [37]. It may be a result of feminization and the singularization of old age [38] as well as low self-esteem and self-support by women [39]. The poverty of older women is especially dangerous because they often live alone with no means to satisfy basic needs, including medication [40].

The present results in both ED and GP groups indicated that the age factor negatively correlated with the satisfaction of patient needs (Table 4). Similar findings were observed in the study of needs of patients with chronic respiratory diseases because a low Camberwell Index was more frequently reported by seniors with no relationship [31]. A previous study showed that the probability of experiencing unmet medical needs were significantly greater among older participants compared to younger [OR = 2.51, 95%CI 1.78–3.56] [32].

The Importance of Health Profile and Health Behavior

Our research showed that the high risk of unmet health care needs was present in populations of ED and PC patients having at least one chronic disease, hospitalized within the last 3 years in any ward, with the BMI index of overweight or obesity, diagnosed with increased creatinine level, systolic blood pressure over 130 mmHg, serum glucose concentration above acceptable parameters; individuals at risk of unmet needs had low levels of healthy eating habits and poor positive mental attitudes. All these socio-clinical factors were significantly associated with the level of needs satisfaction (paragraph 3.3.3).

Previous studies showed that unmet needs were more frequent and higher among individuals with chronic diseases [41]. The Commonwealth Fund 2014 research carried out in 11 developed countries identified socio-clinical characteristics of patients with high-level needs (high-need patients). This high-need patient profile included older age over 65, diagnosis of at least 3 chronic diseases and limited self-service. High-need patients regularly used 4 or more medications, had appointments with at least 4 doctors, and were admitted to the ED multiple times within 2 years prior to/during the study. The high-need patient was also characterized by excessive usage of health benefits, frequent problems with care coordination, and financial limitations in access to care (e.g., patients did not undergo recommended tests, did not buy prescribed expensive medication, and did not attend follow-up appointments) [42].

The coexisting chronic diseases and health behavior correlated negatively with the level of satisfaction of needs also in patients suffering from respiratory system diseases. In this study, patients with a low number of chronic diseases (1) had an approximately 50-times greater chance of a high Camberwell index compared to individuals with

Table 5: The quotient of chances of hospitalization in the ED and GP groups in relation to the level of the satisfaction of patients’ needs.

| Variable                     | Me | No | Yes | OR  | p       |
|------------------------------|----|----|-----|-----|---------|
|                              | n  | %  | N   | %   | CI1     | CI2     |
| GP group Camberwell Index of Needs ≤0.83 | 53 | 51 | 51  | 49  | 0.33    | <0.001  |
|                              | >0.83 | 73 | 76  | 23  | 24  | 0.17    | 0.62    |
| ED group Camberwell Index of Needs ≤0.80 | 36 | 35 | 67  | 65  | 0.28    | <0.001  |
|                              | >0.80 | 64 | 66  | 33  | 34  | 0.15    | 0.52    |

Key: Me – median, p – the calculated level of significance of the Fisher’s accurate dependence test, OR – odds ratio, CI1 and CI2 – borders of 95% confidence interval for OR.
a high number of chronic diseases (15). Individuals with a high positive mental attitude had an approximately 119-times greater chance of a high Camberwell index than individuals with low levels of these behaviors [50]. Another study on chronically ill patients in Canada showed that respondents with at least one chronic condition were more likely to report unmet needs than individuals with no chronic conditions. Moreover, chronic conditions in adults were more likely to develop unmet needs related to resource availability than those with no chronic conditions whatever [43].

Our results showed that overweight or obese patients were at risk of deteriorating the satisfaction of needs. High levels of unmet needs in obese patients were also reported in previous studies [44]. It is known that obesity is a causative factor in a diverse range of comorbid diseases. An overweight patient with BMI at the upper-end range may be at risk of developing metabolic syndrome, cardiovascular disease (CVD), type 2 diabetes (T2D), cancers, stroke, osteoarthritis, and respiratory problems.

Our research investigated correlations between regularly used medication and the satisfaction of patient needs. Despite the findings of the negative correlations in both groups, the correspondence analysis showed that the variable of regularly used medication was of importance for the satisfaction of needs but only in GP patients. In the GP group, usage over 4 medications corresponded with a low level of satisfaction with patient needs. However, for the ED patients, the results cannot be interpreted unambiguously. Therefore, we advise that this factor should be considered in the community care model. For example, a prospective cohort study on unmet needs for medical support in community-dwelling older adults (1,772 elderly subjects) showed that more than half of patients (1,091) experienced difficulty with self-medication. In this study, deprivation of assistance in patients who needed medical support was associated with a higher risk of hospitalization during the study period. In this study, the lack of assistance in those who needed medication assistance was associated with hospitalization during the study period [45].

Quality of Healthcare Provided by the General Practice Personnel
According to our study, ED and GP patients with higher risk of unmet needs were unsatisfied with the quality of benefits received in general practice; patients had no house calls from the GP (when they were necessary according to the patient’s view), had no benefits from health education, and difficulty to perceive the GP as a treatment process continuator (paragraph 3.3.3). These outcomes may result from still poor quality of primary care, reflecting the growing crisis of the healthcare system in Poland [46]. Although the organization of primary care in Poland complies with WHO general guidelines, a majority of its dimensions are negatively evaluated—the weakest part of primary care is linked with its structure, economic conditions, and coordination of care [47].

It was proved that the key features of effective general practice are to have a continuous relationship with a physician, along with first contact, comprehensiveness, and coordination of care [46]. The most important patient needs concern communication with the physician, information conveyed, and improvement in clinical outcomes [47]. It should be remembered that general practice patients come to the GP with certain expectations, and the GPs’ task should be to respond effectively to the patients’ needs [48]. The lack of responsibility of GPs regarding the patient’s expectations may turn into an increased number of ED visits. The research on the frequency of ED visits may be an example in which frequent ED visitors as likely as non-frequent visitors chose their GPs, had good access to general practices, and lasting relations with their physician, knowledgeable about their health and their personal and material situation. Although the frequent ED visitors made twice as many GP appointments, they were less willing to report that the appointment satisfied their expectations (76.12% vs. 92.53%, p < 0.001) [49]. As it can be concluded, it is not so much important the number of visits to general practice clinics as their quality. It is crucial to determine patients’ needs, especially in frequent ED visitors who claim not urgent medical issues. It is also important to provide high-quality services at the level of general practice, responding to patients’ needs and complying with current knowledge and medical art.

Patients’ Beliefs and Expectations
We showed that the risk group for unmet needs consists of ED and GP patients with a low feeling of self-efficacy and those who positioned the feeling of being in control in the dimension “internal” at a low level (paragraph 3.3.3). Several studies have indicated the positive associations between a high level of self-efficacy and management of chronic diseases. The previous study on patients with diagnosed diabetes showed that their maintained beliefs about own efficacy were found to be predictive for maintaining correct values of glycated hemoglobin HbA1c [50].

In another study in patients with type 2 diabetes, high general self-efficacy correlated negatively with the tendency to smoke cigarettes and positively with the tendency to do the prescribed exercises and diet. The general self-efficacy was also a significant predictor in handling asthma [51]. High levels of self-efficacy and the internal health locus of control were consistently associated with medication adherence [52]. In a group of people diagnosed with cancer, the internal health surveillance positively correlates with healthy eating and physical activity [53]. The studies mentioned above directly are in line with our research, indicating that patients with high self-efficacy and health locus of control are crucial components in handling one’s own health. These psychological characteristics make individuals capable of quickly and deftly react to their health needs and efficiently meet them, as well as prevent complications, especially in chronic diseases.

Meeting the Needs and the Number of Hospitalizations
Our results suggest that the presence of unmet needs increases the probability of patients’ hospitalization (Table 5). It was also shown that the number of annual ED admissions for older adults with unmet need for
activities of daily living was higher (1.19) as compared to older adults with met needs (0.87) [14]. In another study, the unmet need for pain management was associated with more frequent ED visits [54]. Other researchers also point out the negative dependence between hospitalizations, and the satisfaction of patients’ needs, mainly at the ED [55].

Limitations of the Study
Unmet needs are declarative and measured from the patient’s point of view in this study. Yet, a standardized measurements of patients’ needs were applied. Another limitation of the present research was the small sample of patients collected at a single ED and four general practice centers.

Conclusion
We conclude that the effective model of community care aimed at satisfying patients’ needs discharged from the ED should embrace the relevant social-demographic characteristics: health profile and the level of health behavior, generalized self-efficacy, positioning of health surveillance/health locus of control, and measures of healthcare provided by general practitioners (GPs). The bottom line is to have these factors be included in the home care model to decrease patients’ hospitalizations. Thus, integration of actions of the ED, general practice, and community care, as well as the activity of the care coordinator, is crucial for advancing patients’ needs and decreasing the number of hospitalizations, especially at the emergency wards.

During the discharge of patients from the ED, it is advised that trained nurses should regularly screen individuals with a high level of risk of not meeting the needs in order to ensure optimal care at home. The ED screening should notably include easily and quickly determined factors at the ED conditions: the age over 45, male gender, primary or vocational education, small households, poor material status and unstable relationships, chronic illness (with at least 1 disease), hospitalization within the last 3 years, BMI indicating overweight and obesity, creatinine levels above the norm, a systolic blood pressure of 130mmHg or above, and serum glucose concentration exceeding the norm. The screening data should be relayed to the care coordinator and, if there is none, to the appropriate GP team and social welfare.

From the perspective of general practice, a care coordinator or community nurse in charge of screening should further analyze the needs of high-risk patients. Special attention should be paid to patients’ unhealthy eating habits, their poor positive mental attitudes, as well as dissatisfaction with the quality of benefits in general practice, failure to obtain house calls from the GP (in a situation when in patient’s view it is necessary), failure to obtain health education benefits, and patient’s difficulty in perceiving the GP as a treatment process continuator. The coordinator may use screening results to promptly introduce an appropriate intervention, e.g., the immediate satisfaction of formal or informal patient care needs, patient and family education, social welfare, or organizing a support group.

Personalized care adequate to the patient’s needs may result in: savings in public sector funds, higher patient satisfaction with care, achieving better health indicators by the patient, fewer hospitalizations, including rehospitalization at the ED. In the future, it is recommended to conduct the intervention studies described above on a larger scale and measure the effectiveness of interventions using objective indicators.

Reviewers
Dr Caroline Nicholson PhD, Director, Centre for Integrated Care & Care Innovation, Mater Misericordiae Ltd., Australia.
Prof. Victoria Tkachenko, MD, PhD Dr Med Sc., Department of Family Medicine, Shupyk National Medical Academy of Postgraduate Education.
Liza Uchimura, MD, MSc, PhD., Researcher, Ministry of Health, Department of Science and Technology, Brazil.

Competing Interests
The authors have no competing interests to declare.

Author Information
Dr. Katarzyna Szwamel, RN, PhD is an assistant professor at the University of Opole, Poland (Europe). Special areas of interest are: coordination of care between emergency departments and general practice, patients’ needs, health behaviors, satisfaction with care, quality of care for patients with chronic diseases, and frailty syndrome.

Prof. Donata Kurpas, MD, PhD is a full professor at the Wroclaw Medical University, Poland (Europe). Her interests lie in general healthcare (incl. value of care, quality of care and the indicators of healthcare effectiveness). She is interested in the public health approach within research and project design as well as the implementation of research results in community-based programs with the help of local stakeholders.

References
1. World Health Organization. Integrated care models: an overview. Health Services Delivery Programme Division of Health Systems and Public Health. [serial online] October 2016 [cited 2019 Aug 16]. Available from: http://www.euro.who.int/__data/assets/pdf_file/0005/322475/Integrated-care-models-overview.pdf
2. Baxter S, Johnson M, Chambers D, Sutton A, Goyder E, Booth A. The effects of integrated care: a systematic review of UK and international evidence. BMC Health Services Research, 2018; 18(1): 350. DOI: https://doi.org/10.1186/s12913-018-3161-3
3. Baxter SK, Johnson M, Chambers D, Sutton A, Elizabeth G, Andrew B. Understanding new models of integrated care: a systematic review examining pathways of change, outcomes and impacts. International Journal of Integrated Care, 2018; 18(s2): 2. DOI: https://doi.org/10.5334/ijic.s2002
4. Puvanendran R. Discharge planning in integrated care. The Singapore Family Physician, 2011; 13(3): 27–31 [serial online] 2011 July 01 [cited 2020...
Szwamel and Kurpas: Indicators of an Integrated Home Care Model Shaped by the Needs of Patients Discharged from the Emergency Department

Art. 16, page 14 of 16

Szwamel and Kurpas: Indicators of an Integrated Home Care Model Shaped by the Needs of Patients Discharged from the Emergency Department, 2018 Jul

5. Sears N, Baker GR, Barnsley J, Shortt S. The incidence of adverse events among home care patients. *International Journal for Quality in Health Care*, 2013 Feb; 25(1): 16–28. DOI: https://doi.org/10.1093/intqhc/mzs075

6. Romagnoli KM, Handler SM, Hochheiser H. Home care: more than just a visiting nurse. *BMJ Quality & Safety*, 2013 Dec; 22(12): 972–4. DOI: https://doi.org/10.1136/bmjqs-2013-002339

7. Wright J, Williams R, Wilkinson JR. Development and importance of health needs assessment. Health needs assessment. *BMJ*, 1998; 316: 1310–3. DOI: https://doi.org/10.1136/bmj.316.7140.1310

8. Carr W, Wolfe S. Unmet needs as sociomedical indicator. *International Journal of Health Services*, 1976; (6): 417–430. DOI: https://doi.org/10.2190/MCG0-UH8D-0AG8-VFNU

9. Herr M, Avrieu JJ, Aegerter P, Robine JM, Ankri J. Unmet health care needs of older people: prevalence and predictors in a French cross-sectional survey. *European Journal of Public Health*, 2014; 24(5): 808–813. DOI: https://doi.org/10.1093/eurpub/ckt179

10. Kortrijk HE, Kamperman AM, Mulder CL. Changes in individual needs for care and quality of life in Assertive Community Treatment patients: an observational study. *BMC Psychiatry*, 2014; 14: 306. DOI: https://doi.org/10.1186/s12888-014-0306-8

11. Park BW, Hwang SY. Unmet Needs and Their Relationship with Quality of Life among Women with Recurrent Breast Cancer. *Journal of Breast Cancer*, 2012; 15(4): 454–461. DOI: https://doi.org/10.4048/jbc.2012.15.4.454

12. Depalma G, Xu H, Covinsky KE, et al. Hospital readmission among older adults who return home with unmet need for ADL disability. *The Gerontologist*, 2013; 53(3): 454–461. DOI: https://doi.org/10.1093/geront/gns103

13. He S, Craig BA, Xu H, et al. Unmet Need for ADL Assistance Is Associated With Mortality Among Older Adults With Mild Disability. The journals of gerontology. *Series A, Biological sciences and medical sciences*, 2015; 70(9): 1128–1132. DOI: https://doi.org/10.1093/gerona/gv028

14. Hass Z, DePalma G, Craig BA, Xu H, Sands LP. Unmet Need for Help With Activities of Daily Living Disabilities and Emergency Department Admissions Among Older Medicare Recipients. The Gerontologist, 2017; 57(2): 206–210. DOI: https://doi.org/10.1093/geront/gnv142

15. Ryan J, Abrams MK, Doty MM, Shah T, Schneider EC. How High-Need Patients Experience Health Care in the United States. *Findings from the 2016 Commonwealth Fund Survey of High-Need Patients. Issue Brief (Commonw Fund)*, 2016; 43(10): 1–20. DOI: https://doi.org/10.15868/socialsector.26066

16. Somme D, Trouve H, Perisset S, Perisset C, Corvol A, Ankrj I, Saint-Jean O, de Stampa M. Adapting the Quebecois method for assessing implementation to the French National Alzheimer Plan 2008–2012: lessons for gerontological services integration. *International Journal of Integrated Care*, 2014; 14(2): None. DOI: https://doi.org/10.5334/ijic.1201

17. Schrijvers G. Opieka koordynowana- lipiej i taniej. [Integrated care: Better and Cheaper]. *Reed business information*. Amsterdam 2016 [serial online] [cited 2019 Jan 06]. Available from: www.nfz.gov.pl/download/gfx/nfz/pl/.../349/36/.../opieka_koordynowana_ksiazka.pdf [in Polish]

18. Pappa E, Kontodimopoulos N, Papadopoulos A, Tountas Y, Niakas D. Investigating unmet health needs in primary health care services in a representative sample of the Greek population. *International Journal of Environmental Research and Public Health*, 2013 May 17; 10(5): 2017–27. DOI: https://doi.org/10.3390/ijerph.10052017

19. Hwang J. Understanding reasons for unmet health care needs in Korea: what are health policy implications? *BMC Health Services Research*, 2018 Jul 16; 18(1): 557. DOI: https://doi.org/10.1186/s12913-018-3369-2

20. Szwamel K, Kurpas D. Unmet needs in emergency department patients as an important aspect of the increasing number of hospitalizations. *Family Medicine and Primary Care Review*, 2017; 19(3): 261–269. DOI: https://doi.org/10.5114/fmpr.2017.69289

21. Dezetter A, Duboux A, Meneau M, Roberge P, Chartrand E, Fournier L. Reasons and Determinants for Perceiving Unmet Needs for Mental Health in Primary Care in Quebec. *The Canadian Journal of Psychiatry*, 2015; 60(6): 284–293. https://doi.org/10.1177/070674371506000607

22. Kujawska J. Organisation and management of care for the elderly. University in Szczecin no 855, Finance, Financial Markets, Insurance, 2015; (1): 709–722 [In Polish: Organizacja i zarządzanie opieką nad osobami starszymi. Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 855 Finanse, Rynki Finansowe, Ubezpieczenia nr 74, t. 1, 2015]. [cited 17 Jan 2018]. Available from: http://www.wneiz.pl/nauka_wneiz/FRFU/74-2015/FRFU-74-t1-709.pdf. DOI: https://doi.org/10.18276/frfu.2015.74/1-62

23. Kurpas D. Paradigma opieki nad chorymi prze-wlekłymi w ramach podstawowej opieki zdrowotnej. Wrocław: Uniwersytet Medyczny im. Piastów Śląskich; 2013 [Rozprawy Habilitacyjne Uniwersytetu Medycznego we Wrocławiu; 6/2013]. [The paradigm of care for chronically ill patients as part of primary healthcare. Wrocław: Medical University of Silesian Piasts; 2013 [Habilitation Dissertations, Medical University of Wrocław; 6/2013]]. [In Polish]

24. Juczyński Z. Narzędzia pomiaru w promocji i psychologii zdrowia. Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego. 2012; 3–183.
25. Bjertnaes OA, Lyngstad I, Malterud K, Garratt A. The Norwegian EUROPEP questionnaire for patient evaluation of general practice: data quality, reliability and construct validity. *Family Practice*, 2011 Jun; 28(3): 342–9. DOI: https://doi.org/10.1093/fampra/cmq098

26. Hirschhorn N, Lamstein SM, Klein S. Quality by Objectives. A Practical Method for Quality of Care. *Assessment and Assurance for Ambulatory Health Centers*. Boston, Massachusetts: G. K. Hall & Co Medical Publications Division; 1978. DOI: https://doi.org/10.1097/00004479-197801000-00006

27. Williams S, Weinman J, Dale J, Newman S. Patient expectations: What do primary care patients want from the GP and how far does meeting expectations affect patient satisfaction? *Family Practice*, 1995; 12: 193–201. DOI: https://doi.org/10.1093/fampra/12.2.193

28. Williams S, Weinman J, Dale J. Doctor-patient communication and patient satisfaction: a review. *Family Practice*, 1998; 15: 480–492. DOI: https://doi.org/10.1093/fampra/m15.480

29. Kurpas D, Church J, Mroczek B, Hans-Wytrychowska A, Nitsch-Osuch A, Kassolik K, Andrzejewski W, Stecikwo A. The quality of primary health care for chronically ill patients: a cross-sectional study. *Advances in Clinical and Experimental Medicine* [serial online] 2013 Jul–Aug; 22(4): 501–11 [cited 2020 Jan 05]. Available from URL: https://pubmed.ncbi.nlm.nih.gov/23986210/

30. Hinkle DE, Wiersma W, Jurs SG. *Applied Statistics for the Behavioral Sciences*. 5th ed. Boston: Houghton Mifflin; 2003.

31. Kurpas D, Wroblewska I, Kassolik K, Andrzejewski W, Athanasiadou A, Mroczek B. Unmet Needs of Patients with Chronic Respiratory Diseases Within Primary Healthcare. *Advances in Experimental Medicine and Biology*, 2015; 861: 43–55. DOI: 10.1007/5584_2015_135

32. Yoon YS, Jung B, Kim D, Ha IH. Factors Underlying Unmet Medical Needs: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, 2019 Jul 5; 16(13): 2391. DOI: https://doi.org/10.3390/ijerph16132391

33. Ha R, Jung-Choi K, Kim CY. Employment Status and Self-Reported Unmet Healthcare Needs among South Korean Employees. *International Journal of Environmental Research and Public Health*, 2018 Dec 20; 16(1): 9. DOI: https://doi.org/10.3390/ijerph16010009

34. Kim J, Kim TH, Park E-C, Cho WH. Factors influencing unmet need for health care services in Korea. *Asia Pacific Journal of Public Health*, 2015; 27: 2555–2569. DOI: https://doi.org/10.1177/1010539513490789

35. Popovic N, Terzic-Supic Z, Simic S, Mladenovic B. Predictors of unmet health care needs in Serbia; Analysis based on EU SILC data. *PLoS One*, 2017 Nov 8; 12(11): e0187866. DOI: https://doi.org/10.1371/journal.pone.0187866

36. Ahn YH, Kim NH, Kim CB, Ham OK. Factors affecting unmet healthcare needs of older people in Korea. *International Nursing Review*, 2013 Dec; 60(4): 510–9. DOI: https://doi.org/10.1111/inr.12055

37. Abramowska–Kmon A. O nowych miarach zaawansowania procesu starzenia się ludności. Studia Demograficzne. [About new measures of the advancement of population aging. Demographic Studies] *Institute of Statistics and Demography, Warsaw School of Economics*, 2011; 1(159) [serial online] [cited 2020 Jan 06]. Available from: http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.cejsh-8bfe7195-2d28-405f-9bd0-c6554ec95360/c_01_Q_Nowych_Miarach_Zaawansowania_Procesu.pdf [In Polish].

38. Błędowski P, Szatrz-Jaworska B, Szweda-Lewandowska Z. Raport na temat sytuacji osób w wieku podeszłym w Polsce. [The report about the situation of the elderly in Poland], Warsaw 2012 [serial online] Dec 2012 [cited 2020 Jan 06]. Available from: http://senior.gov.pl/source/raport_osoby%20podeszle.pdf [In Polish].

39. Główny Urząd Statystyczny. Stan zdrowia ludności Polski w 2009 roku. [Central Statistical Office. Health condition of the Polish population in 2009], Warsaw 2011 [serial online] [cited 2020 Jan 06]. Available from: https://stat.gov.pl/obszary-tematyczne/zdrowie/zdrowie/stand-zdrowia-ludnosci-polski-w-2009-r.6.5.html [In Polish]

40. Gałusza M. Siwiejąca populacja, etyczna, społeczna i ekonomiczna waloryzacja starszości [A Graying population. Economic, Social and Ethical Valorisation of Life], *Annales. Ethics in Economic Life*, 2007; 10(2): 83–93. [In Polish]

41. Levesque J, Pineault R, Hanel M, et al. Emerging organisational models of primary healthcare and unmet needs for care: insights from a population-based survey in Quebec province. *BMC Family Practice*, 2012; 13: 66. DOI: https://doi.org/10.1186/1471-2296-13-66

42. Sarnak DO, Ryan J. How high-need patients experiences the health care system in nine countries. *Issue Brief* (Commonwealth Fund) [serial online] 2016; 1(1): 1–14 [cited 2020 Jan 01]. Available from: https://www.commonwealthfund.org/publications/issue-briefs/2016/jan/how-high-need-patients-experience-health-care-system-nine

43. Ronksley PE, Sanmartin C, Quan H, Ravani P, Tonelli M, Manns B, Hemmelgarn BR. Association between perceived unmet health care needs and risk of adverse health outcomes among patients with chronic medical conditions. *Open Medicine* [serial online] 2013 Feb 26; 7(1): 21–30 [cited 2019 Dec 19]. Available from: https://www.openmedicinefund.org/publications/issue-briefs/2016/jan/how-high-need-patients-experience-health-care-system-nine

44. Ritten A, LaManna J. Unmet needs in obesity management: From guidelines to clinic. *Journal of the American Association of Nurse Practitioners*, 2017 Oct; 29(11): 30–542. DOI: https://doi.org/10.1002/2327-6924.12507
45. Kuzuya M, Hirakawa Y, Suzuki Y, Iwata M, Enoki H, Hasegawa J, Iguchi A. Association between unmet needs for medication support and all-cause hospitalization in community-dwelling disabled elderly people. *Journal of American Geriatrics Society* 2008; 56(5): 881–6. DOI: https://doi.org/10.1111/j.1532-5415.2008.01676.x

46. Krztoń-Królewiecka A, Oleszczuk M, Schäfer WLA, Boerma WGW, Windak A. Quality of primary health care in Poland from the perspective of the physicians providing it.” *BMC Family Practice*, 2016; 17: 1–9. DOI: https://doi.org/10.1186/s12875-016-0550-8

47. Hueston WJ. Does having a personal physician improve quality of care in diabetes? *Journal of the American Board of Family Medicine*, 2010; 23: 82–7. DOI: https://doi.org/10.3122/jabfm.2010.01.090102

48. Bowling A, Rowe G, McKee M. Patients’ experiences of their healthcare in relation to their expectations and satisfaction: a population survey. *Journal of the Royal Society of Medicine*, 2013 Apr; 106(4): 143–9. DOI: https://doi.org/10.1258/jrsm.2012.120147

49. Sultan N, Khawaja AK, Kausar S, Nanji K. Patients’ evaluations of family practice care and attributes of a good family physician. *Quality in Primary Care* [serial online] 2012; 20: 375–383 [cited 2019 Dec 20]. Available from URL: https://www.google.com/search?client=firefox-b-d&q=Patients%20evaluations%20of%20family%20practice%20care%20and%20attributes%20of%20a%20good%20family%20physician.%20Quality%20in%20Primary%20Care%23

50. Kurowska K, Zdrojewska K. Health behaviors versus health locus of control in professionally active firefighters. *Anesthesiology and Rescue*, 2013; 7: 381–389 [In Polish].

51. Adam J, Folds L. Depression, self-efficacy, and adherence in patients with type 2 diabetes. *The Journal of Nurse Practitioners*, 2014 Oct; 10(9): 646–652. DOI: https://doi.org/10.1016/j.nurpra.2014.07.033

52. Thilarajah S, Mientiplay BF, Bower KJ, Tan D, Yong Hao P, Williams G, Koh G, Clark RA. Factors associated with post-stroke physical activity: a systematic review and meta-analysis. *Archives of Physical Medicine and Rehabilitation*, 2018; 99(9): 1876–1899. DOI: https://doi.org/10.1016/j.apmr.2017.09.117

53. Náfrádi I, Nakamoto K, Schulz PJ. Is patient empowerment the key to promote adherence? A systematic review of the relationship between self-efficacy, health locus of control and medication adherence. *PloS One*, 2017 Oct 17; 12(10): e0186458. DOI: https://doi.org/10.1371/journal.pone.0186458

54. Tripathi M, Asthana HS, Asthana AK. Health locus of control and health behaviors in lung cancer patients. *The International Journal of Indian Psychology*, 2016; 3, 11: 20.

55. Hunt LJ, Ritchie CS, Cataldo JK, Patel K, Stephens CE, Smith AK. Pain and emergency department use in the last month of life among older adults with dementia. *Journal of Pain and Symptom Management*, 2018; 56(6): 871–877. DOI: https://doi.org/10.1016/j.jpainsymman.2018.09.005