

Patient Complexity Characteristics in the Hospital Setting

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ABSTRACT

OBJECTIVES: To identify the characteristics of patients, diagnoses, treatments, processes, and communication that account for patient complexity as described by general internists in a hospital setting, as well as the frequency of patient complexity in the hospital setting.

STUDY DESIGN: Multicenter cross-sectional survey at the departments of medicine of 3 large hospitals in Switzerland between July 2015 and October 2015.

METHODS: A total of 111 general internists from 3 hospitals returned the survey, yielding a response rate of 53%. The survey had 21 closed-ended questions about the influence on patient complexity of factors in 4 categories of characteristics: patients' characteristics, comorbidities and diagnoses, therapy, and hospital structure and process.

RESULTS: The proportion of patients estimated to be complex was 42%. Multimorbidity was the characteristic most frequently considered to influence patient complexity (95%; n = 106), followed by multiple therapy changes (94%; n = 104), psychiatric diseases (91%; n = 101), alcohol or drug abuse (91%; n = 101), communication barriers (89%; n = 99), several prescriptions (89%; n = 99), patient aggressiveness (88%; n = 98), therapy compliance (88%; n = 97), communication among divisions within the same hospital (85%; n = 94), and care coordination among providers (85%; n = 92).

CONCLUSIONS: Several factors were identified as playing a role in hospital patient complexity, including multimorbidity, multiple therapy changes, psychiatric diseases, alcohol or drug abuse, and communication barriers.

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Adults who have 2 or more chronic conditions represent 75 million patients in the United States.¹ In Canada, such patients are responsible for 42% of direct and about two-thirds of indirect medical care expenditures.²⁻⁴ Concomitantly, there is an increase in the complexity of the care provided to these patients, as they need more time and resources during their care process.^{1,5} This increased patient complexity is associated with higher healthcare costs,^{1,2,6,7} increased lengths of stay,⁶ lower adherence to treatment,⁸ more frequent medical visits,¹ poorer satisfaction with quality of care,³ lower quality of life and higher mortality,⁹ and an increase in the number of care providers involved in the care process of a single patient.¹⁰

However, little is known about patient complexity. Patients with several pathologies are generally considered more complex than patients with a single disease,¹¹⁻¹⁵ although studies have produced conflicting results.^{16,17} They at least concur that multimorbidity is not the only factor that plays a role in the complexity of a patient: Socioeconomic circumstances, mental health status, and polypharmacy, as well as the coordination of care or medical decision making, can all complicate patient diagnosis and treatment.^{1-3,5,16-18}

Although some studies have looked at patient complexity in the primary care setting, information about complex patients in the hospital setting is lacking.^{6,19,20} In this study, we aimed to identify the characteristics of patients' complexity by surveying general internists in the hospital setting.

METHODS

Study Design, Study Population, and Survey Administration

We conducted a cross-sectional study and surveyed general internists from the medical departments of 3 hospitals in Switzerland between July 2015 and October 2015. The participating hospitals included 1 large community hospital (Kantonsspital Aarau, Aarau, Switzerland) and 2 tertiary care hospitals (Bern University Hospital, Bern, Switzerland; Geneva University Hospital, Geneva, Switzerland). All general internists working in each medical department were eligible to participate. An email invitation was sent to all general internists, along with a link to an online survey. A reminder was sent after 2 weeks. Participation was on a voluntary basis without financial compensation. The survey was anonymous and did not capture information on individual patients. Therefore, no waiver from an ethics committee was necessary.

Survey Instrument

The survey instrument was developed based on existing questionnaires,^{1,21} medical literature, and clinical experience. The final questionnaire included 21 closed-ended questions about the influence on patient complexity of factors in 4 categories: (1) patients' characteristics, (2) comorbidities and diagnoses, (3) therapy, and (4) hospital structure and process. The influence of each factor was rated by the general internists on a 4-point scale: 1, no influence; 2, low influence; 3, moderate influence; or 4, high influence. The influence on patient complexity was considered important when the response was either 3 or 4. We also captured physicians' characteristics, such as position (resident/attending), years of clinical experience, and gender.

Study Outcomes

Patient complexity was defined as patients requiring more time and effort than the average patient.^{1,5,17,22,23} For each of the survey questions, participants were asked to rate how each individual factor may influence inpatient complexity.

Statistical Analysis

We measured the proportions of each answer according to the 4-point scale. To evaluate the weight of influence of each factor across all complex categories, we also calculated the mean point score for each question and took the upper quintile as the most important factors. All statistical analyses were performed in STATA 12.1 (StataCorp LP; College Station, Texas).

RESULTS

Participants

A total of 111 general internists filled out the survey at 1 of the 3 participating sites, for an overall response rate of 53%. Among them, 55% (n = 61) were female, 65% (n = 72) were residents,

26% (n = 28) were senior residents/consultants, and 9% (n = 10) were faculty. The median number of years since medical school was 5 (interquartile range, 3-7). Fewer than half were board certified (41%; n = 45). The mean proportion of estimated complex patients reported by the general internists was 42% (SD = 21), with a range from 20% to 80%.

Overall, the main domains most frequently reported as playing a moderate to high role in patient complexity were comorbidities and diagnoses, followed by therapy (**Figure 1**). The 10 factors most frequently cited as playing an important role in patient complexity across all domains were (1) multimorbidity (95%; n = 106), (2) multiple therapy changes (94%; n = 104), (3) psychiatric diseases (91%; n = 101), (4) alcohol or drug abuse (91%; n = 101), (5) communication barriers (89%; n = 99), (6) numerous drug prescriptions (89%; n = 99), (7) patient aggressiveness (88%; n = 98), (8) therapy compliance (88%; n = 97), (9) communication among divisions within the same hospital (85%; n = 94), and (10) care coordination among providers (85%; n = 92).

Patients' Characteristics

Figure 2 shows how patients' characteristics influence the complexity of care. Participating physicians estimated that drug and alcohol abuse was the most important patient characteristic that influences complexity (91%; n = 101). Aggressiveness and communication barriers were considered to have an important influence by 88% and 89% of the responders, respectively. Therapy compliance and number of hospitalizations were also frequently reported as influences on complexity. Conversely, gender, marital status, support at home, and social assistance were each reported by less than 30% of the participants as having an influence on patient complexity.

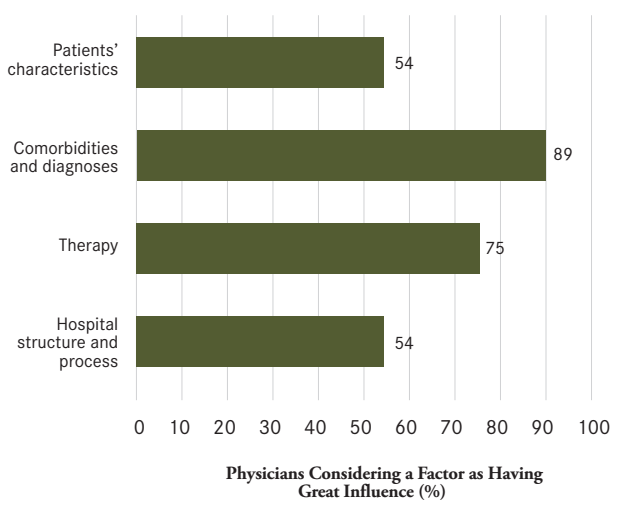
Comorbidities and Diagnoses

Multimorbidity was considered by 95% (n = 106) of the physicians as having an important influence on complexity (**Figure 3**), with 69% (n = 77) rating its influence as high and 26% (n = 29) as moderate. Difficult diagnosis (83%; n = 92) and no diagnosis after 48 hours (75%; n = 84) were also relevant factors for the responders. Sixty-three percent (n = 70) estimated that the types of diseases played a moderate or high role in complexity. Among these, psychiatric and neurologic diseases were most frequently cited as playing an important role.

Therapy

Most of the physicians agreed on the impact of numerous changes of medication (94%; n = 104) and numerous drug prescriptions (89%; n = 99) during the hospital stay. A majority of the responders considered intensive nursing care (66%; n = 74) and the absence

Figure 1. Main Domains Playing a Role in Patient Complexity



of existing clinical guidelines (57%; n = 64) as playing roles in patient complexity. The classes of medication most frequently considered as having an important role were antipsychotics (66%; n = 73), enteral/parenteral alimentation (60%; n = 67), and anti-coagulation therapy (58%; n = 65). Lower percentages of physicians considered antibiotics and antiarrhythmics as important (45%; n = 50; and 42%; n = 47, respectively). Painkillers were less often considered as a relevant factor for complexity, by 41% of physicians (n = 46). Only 27% (n = 30) and 10% (n = 11) considered antidepressants and antihypertensive drugs, respectively, as playing important roles.

Hospital Structure and Process

Communication among divisions within the same hospital and coordination of care were each cited by 85% of the physicians as important in determining patient complexity. A long hospital stay (84%; n = 94) and absence of amelioration in patient condition after 48 hours (80%; n = 89) were also judged as important

Figure 2. Influence of Patient Characteristics on Patient Complexity

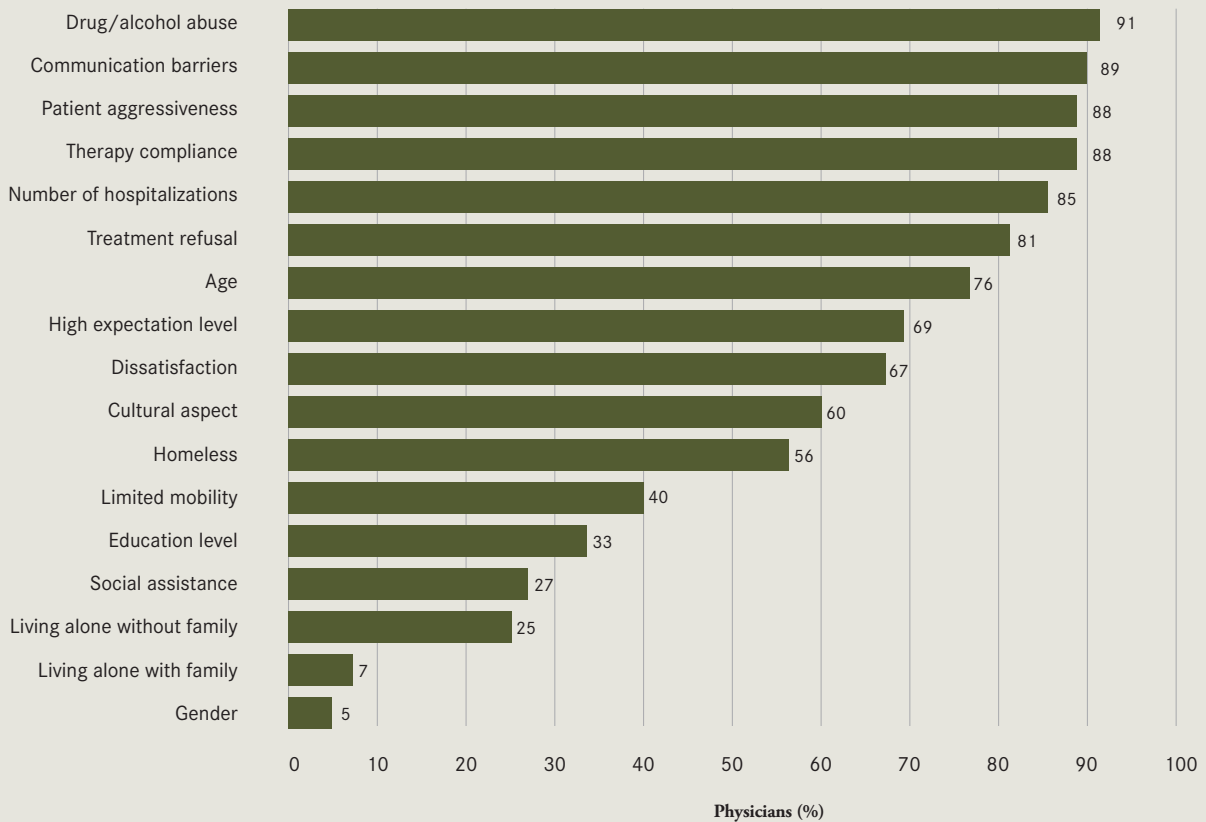
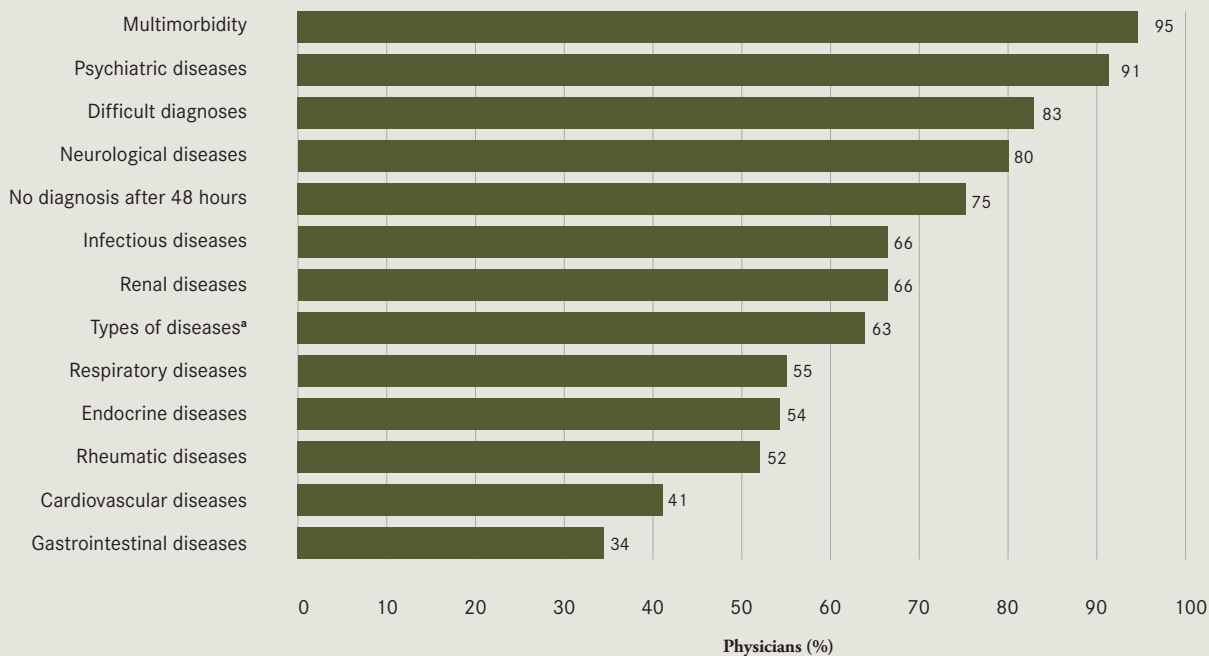


Figure 3. Influence of Comorbidities and Diagnoses on Patient Complexity

*Any type of disease (without more information).

factors. Other factors cited as important included administrative work (73%; $n = 81$) and communication with other care providers (eg, physiotherapists, specialists) (66%; $n = 74$). A minority of physicians identified elective admission (27%; $n = 30$), emergency admission (30%; $n = 33$), and transfer from another division (33%; $n = 36$) or from another hospital (46%; $n = 51$) as having an important influence on a patient's complexity. Considering end-of-life stage, 52% ($n = 58$) of responders estimated that it had influence on complexity; starting palliative therapy (49%; $n = 55$) or a patient's transferring into the palliative division (42%; $n = 47$) had an influence for a minority of responders. However, discussions about initiating palliative care with the patients or their relatives presented greater influence, according to our responders. Interestingly, discussions about initiating palliative care with the patients' relatives were seen more frequently (77%; $n = 86$) as having an important role in complexity than discussions with the patients themselves (59%; $n = 66$).

DISCUSSION

In this multicenter study, we identified the most important factors that were considered to contribute to patient complexity in the hospital setting. The 10 most frequently cited factors were

multimorbidity, multiple therapy changes, psychiatric diseases, communication barriers, patient aggressiveness, alcohol or drug abuse, communication among divisions, numerous drug prescriptions, care coordination, and patient adherence. Among diseases, neurologic and psychiatric ones were the most frequently cited as contributing to patient complexity. Gender, social support, living alone, and patient education were not seen as adding to complexity. Although the majority of the general internists agreed when identifying which factors play an important role in patient complexity, the estimated proportion of complex patients varied widely between 20% and 80%. This is, to our knowledge, the first multicenter study conducted in a hospital setting to better characterize the factors that are related to patient complexity.

Although multimorbidity was the most frequent important factor mentioned, complexity and multimorbidity are not synonymous, as emphasized by Nardi et al.¹⁶ The scope of complexity is broader and could be influenced by many factors, such as family socioeconomic status, diagnostic pathways, and therapies. Our survey identified more precisely which factors are the most likely to influence patient complexity. Interestingly, the most overall relevant main domains for complexity besides multimorbidity were therapy and diagnostic procedures. Therapy was cited as a major component of

patient complexity by 75% of our 111 physicians. Decision making, defined as the evaluation and comprehension of clinical process to plan adequate therapy, has been similarly identified as an important complexity factor in a study among outpatients.¹ Among the 40 general internists who participated in that study, 66% identified decision making as a major component of patient complexity. In the same study, patients identified as complex were older and had a lower income and lower education level. In comparison, in our study, age was also cited as playing a role by 72% of the general internists, but only a minority (33%) considered education level as relevant to hospital complexity. Polypharmacy was also frequently mentioned, which is in line with results of some previous studies in outpatients.^{8,21,24,25} The results of another study showed that the management of a high treatment burden (eg, coping with polypharmacy, multiple appointments) was seen as a reason for complexity in primary care.¹⁰ Finally, substance use disorder and patient behaviors (eg, aggressiveness) were also found to be risk factors for complexity in the primary care setting.^{26,27}

The participants estimated the prevalence of complex patients at between 20% and 80% (mean = 42%). A similar range was found in the outpatient setting, from 15% to 70%.¹ The large variation could be explained by the lack of objective definition of patient complexity, the interpersonal variation of complexity burden, and the possible variation in the patient population for each physician.

Limitations and Strengths

This study has some limitations. First, we performed an exploratory survey study, in which we mainly asked closed-ended questions. Therefore, additional important factors might have been missed. Second, the study was performed in a single country, and the results may not be generalizable to other countries. For example, the overall education level is high in Switzerland and therefore may not play an important role, which might be different in other countries. Third, the survey was performed without referring specifically to a sample of patients but instead was based on the personal experience of each physician. Finally, our response rate was slightly above 50%.

This study has also some strengths. To our knowledge, it is the first study to characterize patient complexity in the hospital setting. Limited data exist on this topic, although complex patients are a daily challenge. We performed a multicenter study to increase the generalizability of our results. We also combined available questionnaires, current literature, and clinical experience in order to construct a tool to capture patient complexity in 4 domains.

CONCLUSIONS

Being able to define complexity in hospitalized patients could help us to tailor specific interventions for the most complex patients to reduce avoidable hospital readmissions and to potentially

improve the quality of life for patients with complex health needs. The patient complexity level is not part of the usual healthcare payment system, and to better capture the characteristic of patient complexity may help to improve the fairness of reimbursement for hospital care.^{6,7}

This multicenter study identified the major components of patient complexity in the hospital setting. Although multimorbidity was an important factor, many other factors play an important role, such as some patient characteristics, specific diagnoses, and care organization. The wide range in the estimated proportion of complex patients underlined the difficulty of objectively defining this category of patients.

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