



ADDIS ABABA UNIVERSITY

Patient-health care interaction in care plan and its associated factors in public hospitals in Addis Ababa, Ethiopia: a facility-based cross-sectional study

A thesis submitted to the Center for Innovative Drug Development and Therapeutic Trials for Africa, College of Health Science, Addis Ababa University in partial fulfillment for the requirements of Master of Science Degree in Clinical Trials

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DECLARATION

I the undersigned have declared that this thesis entitled: **Patient-health care interaction in care plan and its associated factors in public hospitals in Addis Ababa, Ethiopia: a facility-based cross-sectional study** is my original work and has not been presented for a degree in any university. Furthermore, all the sources of information and materials have been acknowledged through referencing.

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Table of Contents

1	Introduction	1
1.1	Background	1
1.2	Statement of the problem	3
1.3	Significance of the study	4
2	Literature Review.....	5
2.1	Introduction	5
2.2	Patient activation level	5
2.3	Socio-demographic characteristics and activation	6
2.4	Clinical indicators /anthropometry and activation.....	7
2.5	Patient-reported factors and Activation.....	7
2.6	Conceptual Framework.....	9
3	Objectives	10
3.1	General Objective	10
3.2	Specific Objectives	10
4	Methods and Materials.....	10
4.1	Study area and period.....	10
4.2	Study Design	10
4.3	Source population.....	11
4.4	Study population.....	11
4.5	Study unit.....	11
4.6	Eligibility criteria	11
4.7	Sample size determination	11
4.8	Sampling Procedure	12
4.9	Study Variables	13
4.10	Data collection tool and method	14
4.11	Operational definition	14
4.12	Quality control measures.....	15
4.13	Data Analysis.....	16
4.14	Ethical consideration	16
5	Results.....	17
5.1	Sociodemographic characteristics	17
5.2	Clinical characteristics.....	19

5.3	Anthropometric characteristic.....	19
5.4	Patient- reported outcome.....	20
5.5	Patient Activation	20
5.5.1	Patient activation and patient characteristics	21
5.5.2	Patient activation and patient satisfaction	21
5.6	Factors associated with patient activation	21
6	Discussion	25
7	Implications of the study	28
8	Strength and limitation	29
9	Conclusions	30
10	Recommendations	30
11	References	31
12	Annex.....	36
13	Appendices	52

List of Figures

Figure 1. Determinants of patient- health care interaction in care plan.....	9
Figure 2. Patient inclusion flow diagram	13
Figure 3. Distribution of monthly income in relation to educational background	17
Figure 4. Distribution of employment status in relation to monthly income	18
Figure 5. Anthropometric characteristic of participants	20

List of Tables

Table 1. Sociodemographic characteristics of participants	18
Table 2 . Educational background in relation to gender.....	19
Table 3. Clinical characteristics of participants	19
Table 4. Activation level of participants	20
Table 5. Bivariate relation between patient activation and patient characteristics/patient reported factor	22
Table 6. Factors associated with patient activation	23

Acronyms/ Abbreviations

AA: Addis Ababa

ACS: Acute Coronary Syndrome

BMI: Body Mass Index

CDC: Center for Disease Control

CDT-Africa: Center for Innovative Drug Development and Therapeutic Trials for Africa

CHF: Chronic Heart Failure

CKD: Chronic Kidney Disease

COPD: Chronic Obstructive Pulmonary Disease

CVD: Cardiovascular disease

DM: Diabetes Mellitus

EHR: Electronic Health Record

ePHR: electronic Personal Health Record

GBD: Global Burden of Disease

HbA1c: Glycated hemoglobin

HIS: Having sufficient information to manage my own health,

HMIS: Health Management Information System

HPS: Feeling understood and supported by healthcare providers

HRQoL: Health-Related Quality of Life

HTN: Hypertension

IHD: Ischemic Heart Disease

IQR: Interquartile range

IRB: Institutional Review Board

LMICs: Low-and middle-income countries

NCD: Noncommunicable Disease

NCDI: Noncommunicable Diseases and Injuries

OOP: Out-Of-Pocket

PAM: Patient Activation Measure

PAM-13: Patient Activation Measure- 13

PAM-22: Patient Activation Measure- 22

SDG: Sustainable Development Goal

SDM: Shared Decision-Making

SPSS: Statistical Package for Social Sciences

SRH: Self- rated health

UHI: understand the health information well enough to know what to do

USA: United States of America

WHO: World Health Organization

ABSTRACT

BACKGROUND: Chronic diseases, also known as Noncommunicable diseases (NCDs), account for 71% of deaths globally with the majority occurring in Low-and middle-income countries (LMICs). More than one-third of all deaths in Ethiopia are due to NCDs. As per the World Health Organization (WHO), better clinical outcome of NCDs was strategized to be achieved through engaging and empowering individuals in their care, i.e., activating patients to have the necessary knowledge, skill, and willingness to self-manage, and promoting healthy behavior through different interventions. The health care approach in the in-patient setup creates an intimidating environment for patients to have an effective patient-health care interaction.

OBJECTIVE: The aim of the study was to assess patient-health care interaction in care plan and associated factors contributing to poor patient-health care interaction among patients with NCDs admitted to public hospitals in Addis Ababa, Ethiopia.

METHODS: A facility-based cross-sectional study was conducted in randomly selected public hospitals in Addis Ababa. A systematic sampling method was used to recruit 372 adult patients who had the main types of NCDs receiving in-patient medical service from five selected hospitals. Patient activation measure-22 tool was used to assess the level of patient-health care interaction in care plan. Patient satisfaction was measured using the Picker Patient Experience Questionnaire-15. Pre-test was done involving 5% of the sample size calculated prior to the actual data collection. Data were collected using face-to-face interview through interviewer-administered structured questionnaire. Collected data were entered to Epi Info and exported to SPSS version 26 for data cleaning and analysis. Descriptive and logistic regression analysis methods were carried out to compute frequency and identify factors associated with patient-health care interaction.

RESULTS: 80% of the patients had high activation with median Patient Activation Measure (PAM) of 63 (IQR 57- 66). On bivariate logistic regression analysis, factors significantly associated with patient activation were age, gender, marital status, educational background, employment status, monthly income, NCD type, and patient satisfaction. Multivariate logistic regression analysis showed the odds of a patient with no formal education having high activation was 73.8% less than a patient with higher education (AOR=0.262, 95% CI: 0.069 - 1.001). Similarly, the odds of a patient with no monthly income having high activation level was 68.2% less when compared to a patient having monthly income of >2500 ETB (AOR=0.318, 95% CI: 0.11 - 0.87). Patients who had good satisfaction with the health care

provided were 2 times more likely to be activated than patients with poor satisfaction (AOR= 2.34, 95% CI:1.32 - 4.15).

CONCLUSION

Most patients in the study were beginning to engage in recommended health behaviors, i.e., attained level 3 of activation with some patients already being proactive about their health and engaged in most recommended health behaviors (level 4) thus showing a good patient-health care interaction with care plan. Having higher education and higher income as well better satisfaction with provided care are strong predictors of having higher patient activation. Recognizing determinants of patient activation will help promote better health outcomes for individuals with NCDs and encourage health care providers to focus on tailoring a personalized care plan for their patients.

1 Introduction

1.1 Background

Chronic diseases, as defined by the Center for Disease Control (CDC), are conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both (1). Also known as Noncommunicable diseases (NCDs), it results from a combination of genetic, physiological, environmental, and behavioral factors. Diabetes Mellitus, cardiovascular disease, cancer, and chronic respiratory disease are the main types of NCDs. Each year, 41 million people die of NCDs accounting for 71 % of deaths globally. About 37% of these deaths occur in people between the ages of 30- 69 years with more than two third of these "premature" deaths occurring in low- and middle-income countries (LMICs). More than three quarters of global NCD deaths (31.4 million) occur in LMICs (2).

The 2016 data of the Ethiopian Noncommunicable Diseases and Injuries (NCDI) Commission report summary shows that more than half (52%) of all deaths and disability are attributable to NCDIs with proportion of deaths being roughly similar in both urban and rural settings (3). Excluding injuries, the data from the 2019 Global Burden of Disease (GBD) shows that 39.2% of all deaths in Ethiopia are due to NCDs of which 5.49% of all deaths occur due to Stroke, 2.3% due to Diabetes Mellitus and 1.83% due to Hypertensive Heart Disease (4).The wealthier socioeconomic group of the country is affected by obesity, high fasting plasma glucose, hypertension, low physical activity and raised total cholesterol. The NCDI commission report summary showed, in 2016, the national prevalence of hypertension was 16% and raised blood glucose prevalence ranged from 3.2-8%. An estimated 65,000 new cancer cases occur each year, affecting females twice as often as males. The leading causes are breast and cervical cancers (3).

The rapid rise in NCDs is predicted to impede poverty reduction initiatives in LMICs, particularly by increasing household costs associated with health care (2). NCDs have a significant impact on out-of-pocket (OOP) expenditures where 23% of total OOP expenditures in Ethiopia are due to NCDs (3). In chronic diseases, non-adherence to long-term therapy reaches an average of 50% in developed countries, less in developing countries, which in turn increases healthcare costs and decreasing positive health outcomes (5). To tackle the impact of NCDs, the Sustainable Development Goal (SDG) came into action in 2016 with one of its goals being reducing premature mortality from NCDs by one third through prevention and treatment by 2030 (6).

In 2015, the World Health Organization (WHO) prepared a framework on integrated people-centered health services with five interdependent strategies to help build effective health service. The first strategy focuses on engaging and empowering individuals and families; it outlines that better clinical outcomes of NCDs are achieved through co-production of care where individuals and families become active participants in their care (7).

Patient engagement or patient activation, also referred in this study as patient-health care interaction in care plan, has gained different meanings and value depending on its varied conceptualizations across the years (8). It can be defined as the process of building the capacity of patients and families, as well as health care providers, to facilitate and support the active involvement of patients in their own care to enhance safety, quality, and people-centeredness of health care service delivery (9). Patient activation means having the necessary knowledge, skills, ability, and willingness to self-manage. Being engaged is broader and considered as an umbrella that combines the knowledge and skills to self-manage with interventions designed to increase such knowledge and skill, and promote healthy behavior such as obtaining preventive care, having proper diet, and exercising regularly (10,11).

As most chronic diseases are related to lifestyle, self-management plays a key role in prevention and management as well as promoting wellness. It is effective in primary as well secondary prevention of chronic diseases and its sequel by creating a pattern for health early in life, and by providing approaches for mitigating illness and dealing with it in later life (12). It involves three aspects of management: medical, behavioral, and emotional. Medical management refers to taking and adhering to prescribed medication as well as adherence to special diet, when required. The second aspect of management involves life roles or behaviors which might need to be either created, maintained, or changed. The last involves dealing with the emotional consequences of having a chronic disease (13).

There are multiple levels a patient can engage in health and health care. Direct care level ranges from a patient simply receiving information to being an active partner in the care team, setting goals, making decisions, and proactively managing one's own health (14). This study focuses on patient engagement at the direct care level.

Patient engagement is linked with improvement in health outcomes like reduction in HbA1c in diabetic patients and cholesterol level, and improvement in self-rated health status (15). It also improves patient safety by helping patients make informed choices about providers, assist to reach an accurate diagnosis and safe use of medications. Engaged patients will also participate in infection control initiatives, help

check the accuracy of their medical records and their care processes, identify and report treatment complication or adverse events, and practice effective self-management and treatment monitoring (16).

Health literacy is key to patient engagement as it empowers patients, facilitate shared decision-making (SDM), increase motivation to adhere to treatment plans, and improve patient satisfaction aside from ensuring patients understand health information (5,16,17). SDM is a process in which clinicians and patients work together to make decisions, and select tests, treatments and care plans based on clinical evidence that balances risks and expected outcomes with patient preferences and values (18). Professional consultation and advice, personalized written information (e.g., leaflets), websites, patient portals and targeted mass media campaigns, can be used to improve health knowledge and engagement (15,18). Patient portal is an electronic personal health record (ePHR) tethered to an electronic health record (EHR) which facilitates engagement by allowing patients to learn about their condition from documented clinical notes and test results, remember information from provider visits, interact with providers through secure messaging to request help between visits and prepare for medical appointments; it is currently becoming recognized as a promising mechanism to support engagement specially for those with multiple chronic diseases as these patients often have multiple specialists, medications and treatment plans (19–21).

Effective engagement can be related to patient's characteristics that includes their attitudes toward partnership, relationship with clinicians, understanding of medical terms and being physically present during patient-provider communication instances, e.g., missing clinical rounds while being away from bed to use the restroom or for investigation purpose (22).

1.2 Statement of the problem

Chronic disease prevention and management is mostly implemented through personalized health care; and patient engagement is considered as a component of such approach to care (15). It promotes mutual accountability and understanding between the patient and health care provider thereby enabling the patient to make informed decisions regarding their care options (9). Patients with chronic disease spend the most time living with and responding to their own health requirements and are mostly the ones making choices regarding healthy behaviors (7). Activated patients have improved health related outcomes such as overall satisfaction with care, self-reported quality of life, functional status, and medication adherence (23).

In Ethiopia more than one-third of all deaths is attributed to chronic diseases (4) and the level of patient activation is low with two-third of the patients falling in the early stages of activation (24). Patients in hospitals are generally believed to feel anxious and stressed, which results in challenges receiving care and processing information. As most chronic disease patients require different specialist services and care providers in hospitals, the patient's information might get fragmented across the service areas and providers (25). This challenging hospital environment affects the delivery of care and the patient-health care interaction in care plan for patients receiving in-patient care as admitted patients are often severely ill and their medical information changes quickly. Admitted patients are also often crowded at their bedside in circumstances like multidisciplinary rounds which further creates an intimidating environment for patients to effectively communicate and be involved in their care.

There are several studies done globally assessing the patient-health care interaction in care plan as well as its determinants among patients with one or more of the chronic diseases. However, despite the rise in the prevalence of chronic diseases in Ethiopia, only one published study is available to date. This institutional based cross-sectional study was able to show the low level of activation i.e., 74.6% of patients had activation of level 1 and level 2 though study participants were limited to Type II diabetic patients attending diabetic clinic in Addis Ababa (AA), Ethiopia (24). Hence, more studies are needed which are inclusive of all the major types of chronic diseases. This will guide health care providers across health facilities in Ethiopia to have better understanding of the patient-health care interaction in care plan and help design effective individualized health care plan as well as empower admitted patients to have the knowledge and skill to manage their illnesses. As a result, this facility based cross-sectional study was designed to assess the level of patient-health care interaction in care plan and its determinants of patients presenting with one or more of the main types of chronic diseases receiving in-patient care in public hospitals of AA, Ethiopia.

1.3 Significance of the study

The patient-health care interaction in care plan among patients with chronic disease is poor in most countries globally as well as in Ethiopia. As the study was conducted among patients with chronic disease, the generated evidence will help to inform health care providers about the current level of patient engagement with care plan among patients with chronic diseases. It also assessed determinants of engagement and having this knowledge can assist health care providers in educating patients on self-management and tailoring personalized care plan which is of paramount importance in providing

effective chronic disease prevention and management. The findings of this facility-based study can guide hospital administrators and other relevant stakeholder to provide a better patient environment that can help in strengthening the patient-provider relation and increase patient satisfaction. Moreover, it will inform patients with chronic disease on the significance of having the knowledge, skill, and confidence to manage one's own illness as well as empower them to engage in their care plan.

2 Literature Review

2.1 Introduction

This review summarizes the average activation level and the distribution of activation across the different levels among the main types of NCDs (Appendix 2). It also discusses the association of patient characteristics with patient activation/engagement. Assessed variables included socio-demographic characteristics, health literacy, health status, illness perception, health care utilization, medication adherence and patient satisfaction.

The review includes studies done over the last 10 years, discussing on level of patient activation/engagement among patients with noncommunicable diseases, and impact of activation on health outcomes and behaviors. Reviewed studies were identified through databases, PubMed Central and Google Scholar, and relevant web search. Key search terms included patient activation, patient activation measure, patient engagement, chronic disease and noncommunicable disease. Studies were included if they contained one or more of the noncommunicable diseases, Patient activation measure-22 (PAM-22) or patient activation measure-13 (PAM-13) used as activation measurement tool, if they assessed significance of patient activation on health outcome or behavior, or determinants of patient activation.

2.2 Patient activation level

The patient activation level was measured using PAM in all the reviewed studies. Considering level 1 and 2 as low activation and level 3 and 4 as high activation, twelve of the studies (26–37) reported more than half of the patients having high level of activation while seven studies (24,38–44) reported majority having low activation, and two studies didn't mention the number of patients falling under high or low activation (45,46). There was no study from Africa aside from the one study done in Ethiopia which found 74.6% of the study participants had low activation level (24).

2.3 Socio-demographic characteristics and activation

Age is one of the patient characteristics assessed in the reviewed studies. It was found to have significant association with patient activation where younger age was associated with higher patient activation (26,38), and older patients were found to have lower activation level (24,27,39,40). In one of the studies of diabetic patients, lower age was associated with higher patient activation only among the male group (28). In a study done in the Netherlands, only mild association was found while that done in USA and Singapore showed no association (29,45).

A study done among patients with diabetes and atrial fibrillation showed a significant association between gender and activation where men had higher activation level (26,29). A cross sectional study particularly designed to investigate if the degree of patient activation of diabetic men and women patients differ or not found no association. In this study, the median PAM scores were 55.6 for both men and women with Interquartile range (IQR) 51.0–63.1 and 48.9–61.9, respectively; there was no significant difference in the distribution of the PAM levels between the two genders either (28). The result of a study done among COPD patients across different countries found patients with low PAM score, more often, being men (30).

Of the sociodemographic characteristics, education level was also found to be associated with activation where those highly activated had higher education (26,29,31), and less activated patients had no education (41) and/or lower education (24,38–40). However two studies showed no association (42,45) though the study done on patients with COPD initially presented association in the bivariate analysis which was not supported by the multivariate analysis of the study (42).

A study done in the USA found a significant association between employment and activation where higher activation was associated with full time or part time employment (29). Similarly, a study done in Malaysia showed patients who are employed were three times more likely to have higher activation than those unemployed (AOR= 3.348, 95% CI 1.167- 6.724) (32). Another study also done in USA prostate cancer survivors found unemployment to be significantly associated with the lowest mean activation score (46).

Another patient's demographic characteristic assessed for association with activation was marital status and a study done among patients having atrial fibrillation showed those who are in a committed relationship or married had higher activation (29). Similarly, a study comparing survivors of prostatic

cancer and breast cancer found association of activation with marital status among prostatic cancer survivors in which those unmarried had lower activation whereas no association was found among breast cancer survivors (46).

Few studies sought to assess whether income, financial satisfaction or distress have any relation with activation. One of the studies done in the US showed less activated patients as having worse financial satisfaction (39) while a study in the Netherlands found only mild association (38) and the rest of the studies did not find association (27,29,42,45).

2.4 Clinical indicators /anthropometry and activation

Many studies found BMI to be a determinant of activation. Higher BMI, i.e., overweight and obesity were found to be associated with lower patient activation (24,29,38,42) and being underweight was also associated with lower activation (30).

Patient activation levels were significantly associated with glycemic control. Activation scores were lower for patients with poor glycemic control, i.e., higher HbA1c (24), and higher for those with lower HbA1c (33).

2.5 Patient-reported factors and Activation

An individual's health status can be measured using self-reported outcome measures such as self-rated health (SRH) and health-related quality of life (HRQoL) (47). SRH evaluates how an individual rates his or her current health status using a single-item health measure that is scaled from poor to excellent (48). Patients who reported better health status had higher activation (26,31,34) while having worse health status was associated with lower activation (27,30,40). Those who reported to have good health status had 6.482 times odds of having high activation level than those that reported poor health status (32).

In a study done among atrial fibrillation patients, activation influenced certain dimensions of quality of life where less activated patients reported less symptoms and more activated patients had increased treatment concern thereby highlighting the contribution of lower activation levels on lack of informed decision-making (35).

The odds of patients with low level of activation experiencing a clinically meaningful decrease in general mental HRQoL was 1.95 times the most activated patients; patients with low level of activation also had 2.69 times the odds of having a clinically meaningful decline in disease specific HRQoL than the most

activated patients in the 3 months following hospital discharge (40). In study done in the Netherlands concerning COPD patients, bivariate analysis showed association of patient activation with physical and mental domains of health status; however, in the multivariate analysis, health status was not a key determinant of patient activation for self-management (42).

Illness perception is a good predictor that activated patients will engage in self-management behaviors. The result of a study done in Nepal among COPD patients with multimorbidity showed a more negative illness perception was associated with poor activation (31). Supporting this, studies done in the Netherlands showed comparable finding (38,42).

Health literacy is the ability of an individual to acquire and translate knowledge and information to maintain and improve one's health through a way that is appropriate to the individual (49); it can be considered as one of the important determinants of activation. A study done in Nepal among COPD patients with comorbidities found three fourth of the patients to have low health literacy when evaluated for the five domains of health literacy questionnaire and the patients had difficulty in feeling understood and supported by healthcare providers and had insufficient information to manage their own health (41). There was a positive linear relationship with the three domains of health literacy questionnaire and patient activation after adjusting for perceived skills at using information technology for health and the other domains of health literacy questionnaire excluding one of the domains (45). Among two studies done in USA, the study done on chronic heart failure patients found worse health literacy level with less activated patients (39) and another study which involved breast cancer patients found no significant difference in mean patient activation scores between patients with limited cancer health literacy and those with adequate cancer health literacy (34). Better HgA1c level was achieved in patients with diabetes also having hypertension and/or ischemic heart disease only when high health literacy was combined with high activation level (43).

Another important patient-reported factor is patient satisfaction. The result of a population based cross-sectional study done in different countries of COPD patients showed those satisfied with their doctors reported higher engagement (30). Another study done in chronic heart failure patients found less activated patients as having worse satisfaction (39). Contradictory to this, a study among atrial fibrillation patients lacked a significant relationship between the total as well as subscale scores of patient satisfaction and activation (29).

Medication adherence refers to the act of complying to the recommendations given by the health care provider with respect to timing, dosage, and frequency of medication taking (50). Higher patient activation is linked to better medication adherence (36,37,44). The study done among asthmatic patients had peculiar difference among the different levels of activation where patients in level 4 had lower adherence mean score in comparison to participants in activation level 2 but those in level 2 and 3 had better adherence than level 1 patients (37).

2.6 Conceptual Framework

Increase in age of a patient will impact the level a patient interacts in his/her care plan i.e. expected to decrease level of activation (24,27,39,40). Gender is also expected to impact the level of patient-healthcare interaction with men expected to interact better than women (26,29). Being married is another variable expected to have a positive impact on the patient-health care interaction (29). A patient-reported outcome variable i.e. patient satisfaction will also impact the level a patient with NCDs interacts with his/her care plan (30,39). Employment status of a patient, which ranges from full time to non-employed, impacts the amount of monthly income the patient earns which in-turn impacts patient-healthcare interaction (29,32,39,46). Another demographic characteristic which will have an impact on level of patient-healthcare interaction in care plan is education level (24,26,29,31,38–41) which as well is expected to affect employment status of a patient there by indirectly impacting monthly income which will also affect patient- health care interaction .

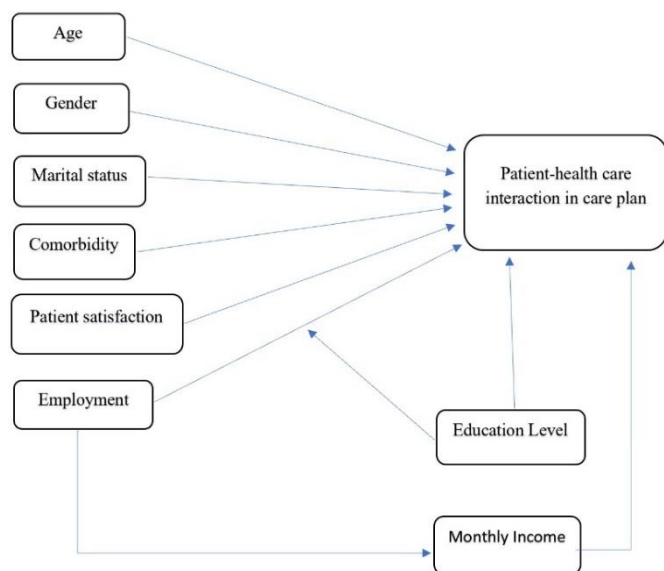


Figure 1. Determinants of patient-health care interaction in care plan

3 Objectives

3.1 General Objective

The main purpose of this study was to assess the level of patient-health care interaction in care plan of patients with chronic diseases admitted to public hospitals in Addis Ababa, Ethiopia and associated factors contributing to poor patient-health care interaction in care plan.

3.2 Specific Objectives

- To assess the level of patient-health care interaction in care plan among patients with chronic diseases admitted to public hospitals of Addis Ababa.
- To identify factors associated with patient-health care interaction in care plan including patient-reported outcome such as patient satisfaction.

4 Methods and Materials

4.1 Study area and period

The study was conducted in public hospitals in Addis Ababa, the capital city of the Federal Democratic Republic of Ethiopia. According to the United Nations population projection, the 2022 metro area population of Addis Ababa is 5.2 million. The 2022 Federal Ministry of Health master facility registry indicates that there are 39 hospitals in AA. Thirteen of the hospitals are public and classified as general or specialized according to the services they provide. The public hospitals are Alert Hospital, Amanuel General Hospital, Eka Kotebe General Hospital, Gandhi Memorial Hospital, Gefersa Mental Health Rehabilitation Centre, Kidus Petros Specialized Hospital, Menelik II Comprehensive Specialized Hospital, Ras Desta Damitew General Hospital, St. Paul's Hospital Millennium Medical College, Tikur Anbessa Specialized Hospital, Tirunesh Beijing General Hospital, Yekatit-12 General Hospital Medical College, and Zewditu Memorial Hospital. Of the thirteen hospitals, ten provide service for the management of the main types of chronic diseases. The study was conducted from February 2023 to May 2023.

4.2 Study Design

A facility based cross-sectional quantitative study design was used.

4.3 Source population

All patients diagnosed with the main types of NCDs, i.e., Diabetes Mellitus, Cardiovascular diseases, Cancers, and Chronic respiratory diseases receiving health care service in hospitals of AA, Ethiopia.

4.4 Study population

Patients ≥ 18 years of age diagnosed with the main types of NCDs receiving inpatient health care service in selected public hospitals of AA, Ethiopia at the time of the study.

4.5 Study unit

Systematically selected patients having one or more of the NCDs who are admitted to medical, cardiac or oncology ward of the selected public hospitals.

4.6 Eligibility criteria

Inclusion criteria

- Patients ≥ 18 years of age diagnosed with at least one NCD (Diagnosis made by a physician and documented on patient chart)
- Receiving inpatient medical service with length of stay of ≥ 48 hrs.
- Able to give informed written consent

Exclusion criteria

- Newly diagnosed patients
- Patients readmitted within the data collection period
- Critically ill patients
- Pregnant women
- Patients with diagnosed mental illness or cognitive impairment

4.7 Sample size determination

Objective 1: Sample size determined using level of patient activation

A study by Assefa et al. (24) found the prevalence of patient activation according to each level as; level 1= 27.8%, Level 2= 46.8%, Level 3= 23.9%, Level 4= 1.5%. Considering level 1 and 2 as low activation level and levels 3 and 4 as high activation level, we take the prevalence of low activation level i.e.,

74.6% as the expected prevalence for our sample size calculation. Using the single population proportion formula, the sample size for the study was determined as follows.

$$n = \frac{Z(\alpha/2)^2 P(1-p)}{d^2}$$

n = sample size,

Z = Z statistic for a level of confidence,

P = expected prevalence

d = precision

By taking the level of confidence as 95%, $\alpha = 0.05$, with degree of precision of 5% (0.05), and prevalence of 74.6%, the minimum sample size needed for the study will be 289. Anticipating a nonresponse rate of 10%, the final sample size is calculated to be 322 patients.

Objective 2: Sample size determined by using associated factors

As patient's activation level increase, satisfaction of patients with their treating physicians increases. 25.4% of patients with low level of activation (level 1) reported being 'very satisfied' while 66.3% of highly activated patients (level 4) reported being 'very satisfied' (30). Sample size calculation using single population proportion using the prevalence of satisfaction among highly activated patients, i.e., 66.3%, level of confidence as 95%, $\alpha = 0.05$, and degree of precision of 5% (0.05), the minimum sample size needed for the study will be 340. Anticipating a nonresponse rate of 10%, the final sample size is calculated to be 378 patients.

After consideration of both objective-based sample sizes, the study used the highest sample size obtained as the final sample size for the study, i.e., 378 patients.

4.8 Sampling Procedure

Among the ten public hospitals in Addis Ababa giving chronic disease management service, five hospitals were selected using random sampling technique. The calculated sample size was proportionally allocated to each selected hospital. Allocation proportion was calculated considering a last quarter NCD related in-patient data obtained from each facilities' respective wards as well as Health Management Information Systems (HMIS) office. A list of possible participants was obtained from the

in-patient HMIS registry of the selected facilities. Thereafter, participants were selected from the list using systematic random sampling technique (Figure 2).

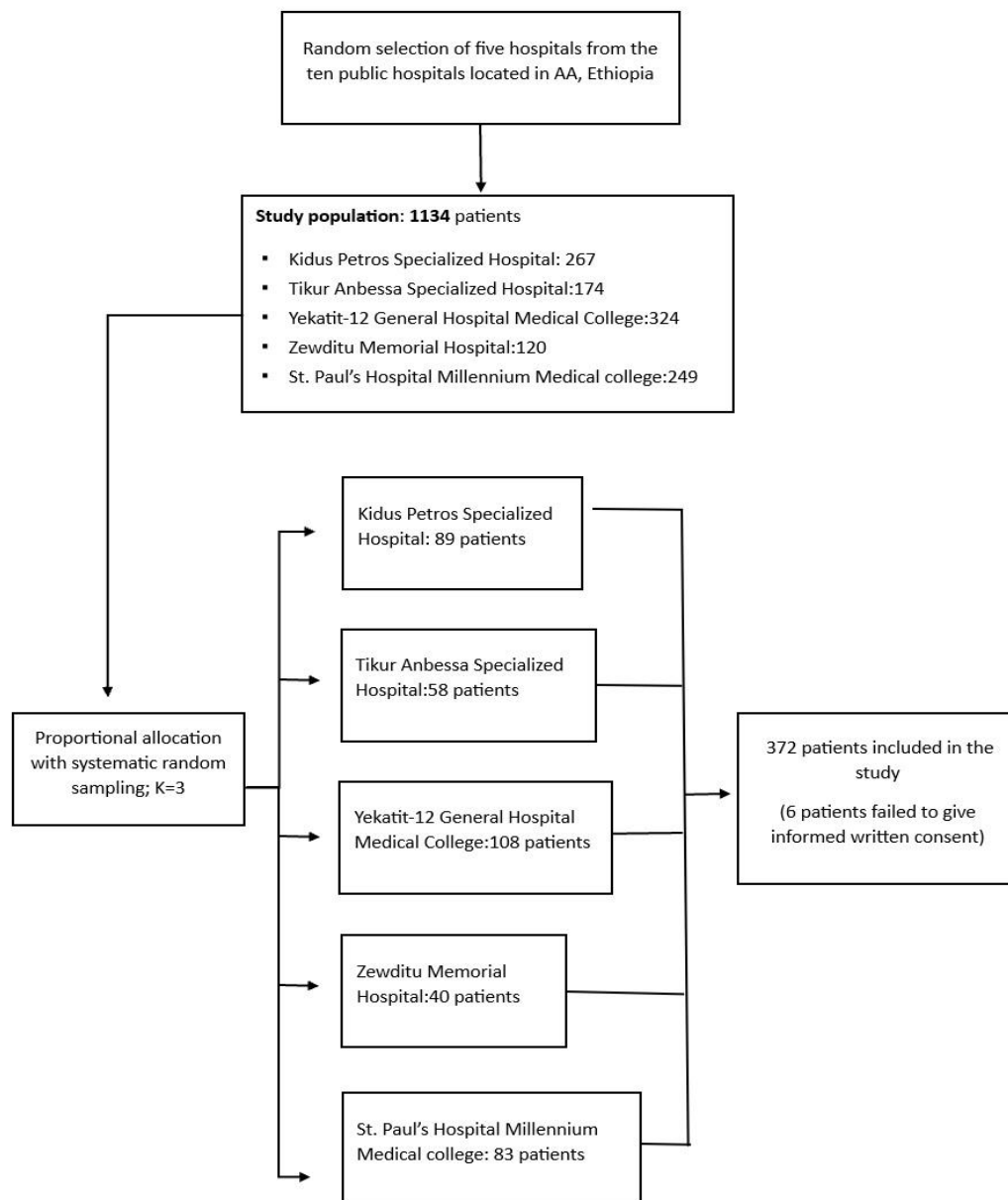


Figure 2. Patient inclusion flow diagram.

4.9 Study Variables

Dependent variable

Patient-health care interaction in care plan

Independent variables

Socio-demographic characteristics of patient: Age, Gender, Marital status, Educational background, Monthly income, Employment status

Clinical characteristics: Duration of illness since diagnosis, Comorbidity

Anthropometric characteristic: BMI

Patient-reported outcome: Patient satisfaction with health care provided

4.10 Data collection tool and method

The data collection tool included checklist for measurement of level of patient-health care interaction in care plan (Annex 3) adopted from literature (51). The adopted tool i.e., Patient Activation Measure (PAM) maintains precision across different demographic and health status groups (51). The original PAM is a 22-item version and through the years a shortened 13-item version was developed which is also reliable and valid. However, to attain the highest level of measurement precision, the 22-item version was considered more desirable (52) and was believed to achieve the goal of measuring activation in this study population. The checklist was prepared in English. Then, the English version of the questionnaires was translated to local dialect (Amharic). The tool also included participants background information (Annex 2) such as patient's socio-demographic data, clinical characteristics, and anthropometry; and patient-reported satisfaction level with their health care provided (Annex 4). Data was collected using an interviewer-administered structured questionnaire by trained ward nurses using a face-to-face interview method.

4.11 Operational definition

Patient activation measurement

PAM is used to assess the level of patient-health care interaction in care plan. It is a reliable and valid tool used in clinical setting to measure a person's self-concept as a manager of his or her health and health care through a series of answers to questions, and to develop care plans (10,51). It is scored on a scale of 0–100 where 0 is the lowest possible activation and 100 is the highest possible activation (Annex 3). The metric scale is translated to categorical scale where patients are categorized into four levels of activation with level 4 categorizing as most activated and level 1 as least activated.

Activation is developmental where the different elements that constitute it have a hierarchical order. Level 1, indicated by a score of 0.0–47.0, suggests the patient may not yet understand that their role is important; level 2, 47.1– 55.1, signifies that a person lacks the confidence and knowledge to take action; level 3, 55.2– 72.4, signifies that a person is beginning to engage in recommended health behaviors; and level 4, 72.5–100, indicates that a person is proactive about health and engages in most recommended health behaviors (10,51,53).

Patient satisfaction measurement

Patient satisfaction is the level of satisfaction that a patient experiences because of having used a health care service; the experience refers to the difference between the expected services and the actual or perceived experience of the service (54).

The Picker Patient Experience Questionnaire-15 (PPE-15), an easy and quick tool applicable for different healthcare setups, consists of fifteen basic set of questions that examine specific aspects of patient experience (55) (Annex 4). For statistical analysis, each item is coded up as a dichotomous score which indicated the presence or absence of a problem, i.e., aspect of health care that could be improved upon as per the patient’s perspective. The items are then added, and the total is scored on the metric scale ranging from 0-100 (no problems-most problems) (56). For statistical purpose, the final score was dichotomized into Satisfied and Not satisfied taking 50% as a cut-off score.

Main types of NCDs: The study lists Diabetes Mellitus, Cardiovascular diseases, Cancers, and Chronic respiratory diseases as the main types of NCDs.

4.12 Quality control measures

Clarity and understandability of the adopted data collection tool was checked by conducting a pre-test on 5% of the sample size in Menelik II Comprehensive Specialized Hospital (pre-test site selection was done using random selection from facilities not selected for the main data collection) .

Training: Data collectors were given a one-day training on the objective of the study and method of data collection prior to the start of data collection.

Supportive supervision: A ward head nurse was assigned as a supervisor at each selected hospital/ward to oversee the data collection process and assist in managing any unforeseen events that might occur

through the study period. The principal researcher also provided support in the supervision process on regular basis to assure quality of collected data.

Data entry and management: Participant's data was collected using paper-based questionnaire which was then entered to Epi Info version 7.2.5.0. The software was also used to clean incomplete and/or duplicate data.

4.13 Data Analysis

SPSS version 26 was used for analysis of data. Participant characteristics were summarized as frequency and percent using descriptive statistics. The PAM scores were categorized into four activation levels based on the standard cut-off of PAM and then dichotomized into low activation group (level 1 and 2) and high activation group (level 3 and 4). All the continuous variables, i.e., Age, Monthly income and Duration of illness were converted to categorical variables. Chi-Square test was used to assess association between patient activation and patient characteristics. Fisher's exact test was used for variables that violated the assumptions of chi-square test. Bivariate logistic regression analysis was done and the independent variables with P-value of <0.25 were further selected and fitted to a multivariate logistic regression model to assess the presence and strength of association between the dependent and independent variables. A P-value of $\leq 5\%$ level of significance with 95% confidence interval was used to assess strength of association. Fitness of the regression model was checked using the Hosmer-Lemeshow test. Multicollinearity was also assessed using Variance Inflation Factor (VIF).

4.14 Ethical consideration

Ethical clearance was obtained from the Scientific and Ethics Review Committee of CDT-Africa, College of Health Sciences, Addis Ababa University, and Addis Ababa Public Health Research and Emergency Management Directorate. Permission was also sought from all selected public hospital's administration/Institutional Review Board (IRB) before conducting participant recruitment for interview.

The study was conducted in accordance with the declaration of Helsinki. Informed written consent was obtained from each study participant prior to initiating interview (Annex 1). Participation in this study was made sure to be on a voluntary basis, and each study participant was informed of his/her right to refuse or withdraw at any point during the interview period without any precondition. For participants who were unable to read and write, all the necessary information was read to them in the presence of an

impartial witness prior to signing the consent form. Codes were used as patient identifier to ensure confidentiality.

5 Results

A total of 372 participants admitted to the selected five public hospitals responded to the study with a response rate of 98.4%. Participants which responded as “Strongly disagree” or “Strongly agree” on all the items of Patient Activation Measure were excluded from the data analysis to avoid responder bias. As a result, a total of 370 participants were included for the analysis.

5.1 Sociodemographic characteristics

Table 1 shows the sociodemographic characteristics of patients where more than half (55.7%) of the participants fall in the age group of 18-54 years with a mean age (SD) of 50.68 (± 17.52) years. Female participants accounted for 52% of the participants. Majority of the participants (66.2%) were married. About one-third of the participants had primary level education and those having higher education accounted for 18.6% of the participants. More than half (60%) of participants who were unable to read and write had no income and two-third of the participants having higher education had a monthly income of >2500 ETB (Figure 3). 62.3% of the patients with higher education are males while majority of patients who can't read and write and with no formal education are females, 72.4% and 57.8% respectively (Table 2). Unemployed patients along with retirees accounted for 88.4% of the patients with no income (Figure 4).

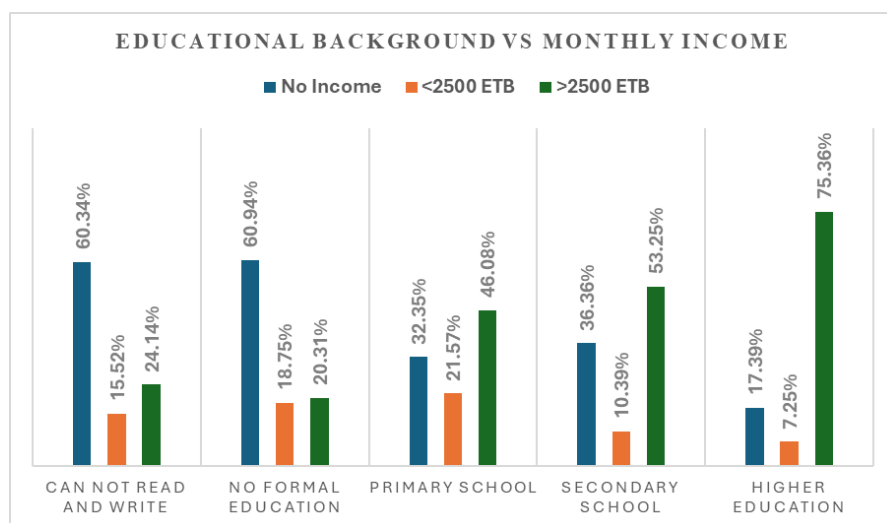


Figure 3. Monthly income in relation to educational background

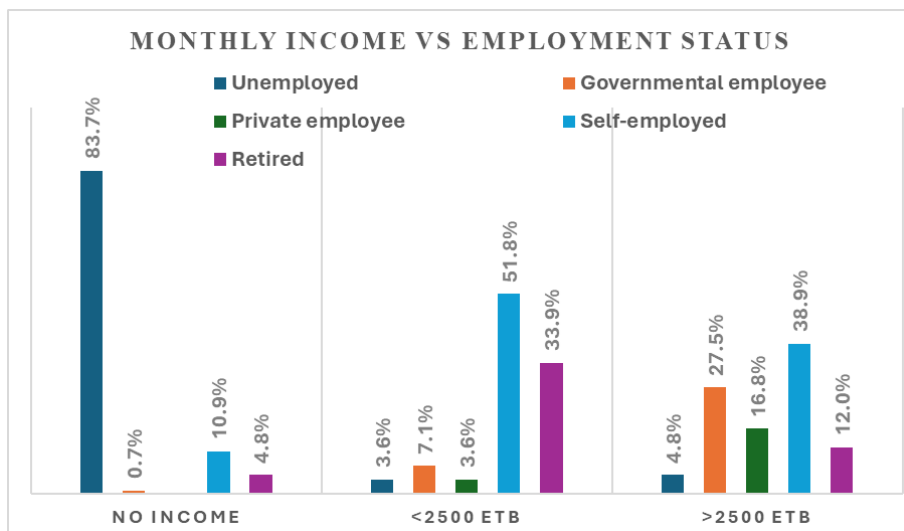


Figure 4. Employment status in relation to monthly income

Table 1. Sociodemographic characteristics of participants

Variable	Category	Frequency	Percent
Age	18 - 54 years	206	55.7
	55- 64 years	65	17.6
	65 years and above	99	26.8
Gender	Male	176	47.6
	Female	194	52.4
Marital status	Single	81	21.9
	Married	230	62.2
	Divorced/Separated	20	5.4
	Widowed	39	10.5
Educational background	Cannot read and write	58	15.7
	No formal education	64	17.3
	Primary school	102	27.6
	Secondary school	77	20.8
	Higher education	69	18.6
Employment status	Unemployed	133	35.9
	Governmental employee	51	13.8
	Private employee	30	8.1
	Self-employed	110	29.7
	Retired	46	12.4
Monthly income	No Income	147	39.7
	<2500 ETB	56	15.1
	>2500 ETB	167	45.1

Table 2. Educational background in relation to gender

		Educational background				
		Can not read and write	No formal education	Primary school	Secondary school	Higher education
Gender	Male	27.6%	42.2%	50%	50.6%	62.3%
	Female	72.4%	57.8%	50%	49.4%	37.7%

5.2 Clinical characteristics

Cardiovascular diseases accounted for two-thirds (67.3%) of the participants' admission diagnosis while cancer accounted for only 9.5% of the admission diagnosis. About half (48.6%) of the participants had duration of illness lasting from 1-5 years and the proportion of participants who reported having comorbid NCD was almost equal to those who reported not having comorbid NCD (50.8% vs 49.2%) (Table 3).

Table 3. Clinical characteristics of participants

Characteristic	Category	Frequency	Percent
NCD necessitating admission	Cancer	35	9.5
	Cardiovascular disease	249	67.3
	Chronic Respiratory Disease	23	6.2
	Diabetes Mellitus	63	17.0
Duration of illness	<1 year	65	17.6
	1-5 years	180	48.6
	5-10 years	59	15.9
	>10 years	66	17.8
Comorbid NCD	No	182	49.2
	Yes	188	50.8

5.3 Anthropometric characteristic

BMI was used as a measure of weight status of participants and 56.8% of the participants had a normal weight status, i.e., BMI of 18.5-24.9 (Figure 5).

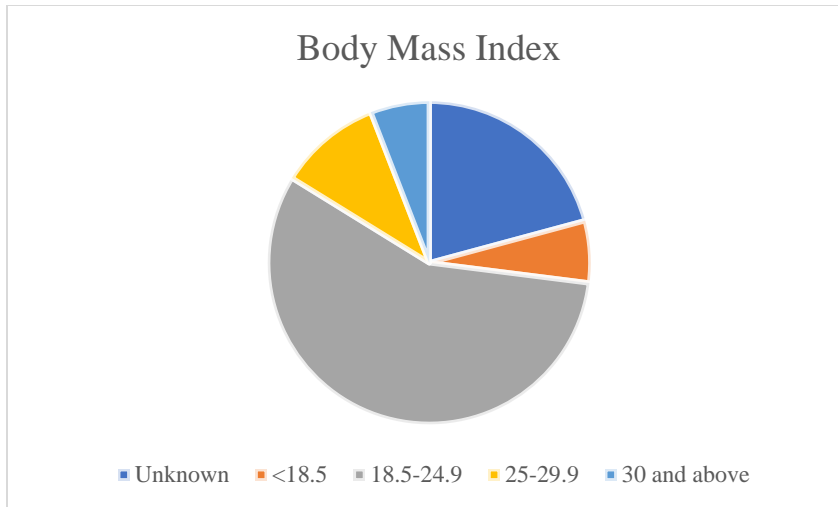


Figure 5. Anthropometric characteristic of participants

5.4 Patient- reported outcome

Patient satisfaction with health care provided was an important patient-reported outcome assessed using the Picker Patient Experience Questionnaire-15 (PPE-15) with outcome of 60.3% of patients reporting satisfaction with health care provided. The tool had an acceptable internal consistency of Cronbach’s alpha value of 0.64.

5.5 Patient Activation

Patient activation was measured using an adopted PAM-22 which had an overall Cronbach’s alpha value of 0.857. The median PAM was 63 (IQR 57- 66). Activation level was categorized into four increasing hierarchical levels and 272 (73.5%) of the participants had an activation level of 3 and only about 5% of the participants had an activation level of 1. The activation levels were further dichotomized into low activation and high activation (Table 4).

Table 4. Activation level of participants

Patient Activation level	Frequency	Percent	Total Percent	
Low activation	Level 1	18	4.9	20
	Level 2	56	15.1	
High activation	Level 3	272	73.5	80
	Level 4	24	6.5	

5.5.1 Patient activation and patient characteristics

More than half of the patients with higher activation were in the age group of 18-54 years. The percentage of male patients with high activation was higher than female patients (86.4% vs 74.2%). When considering educational background, Illiterate and those who didn't receive formal education constitute 1/3rd of the total patients and these patients accounted for only 28% of patients with high activation. Half of the patients with high activation earn higher monthly income and when considering patients with low activation the majority(57%) have no monthly income. Only ~80% of the patients had a recorded BMI and of these 3/4th of the patients with high activation had a normal BMI(18.5-24.9) (Table 5).

5.5.2 Patient activation and patient satisfaction

About 65% of patients with high activation reported having been satisfied with the provided care and among patients with low activation only 43% of patients reported being satisfied (Table 5).

5.6 Factors associated with patient activation

Association between patient activation level and characteristics of patients as well as patient-reported outcome was tested using Chi-square test as shown in Table 5. For variables not meeting the assumptions of chi-square, fisher's exact was used to check association. Age, gender, marital status, monthly income, educational status, BMI, and patient satisfaction with health care delivered had significant association with a weak measure of association at significance level of P value of ≤ 0.05 . There was no significant association between activation level and employment status, NCD type, duration of illness or presence of comorbid NCD.

Bivariate logistic regression analysis model was used to assess the presence and strength of association of each independent variable with the level of patient-health care interaction in care plan. Sociodemographic characteristics of patients which included age, gender, marital status, educational background, employment status and monthly income were put into the model for analysis. Patient clinical characteristics such as the type/s of NCD patient presented with, duration of illness and presence of comorbid NCD were also put into the model for analysis along with patient's BMI and satisfaction with health care provided. Age, gender, marital status, educational background, employment status, monthly income, NCD type, and patient satisfaction were associated at a significance value of $P < 0.25$. These variables were further put into a multivariate logistic regression model for analysis. Educational

background, monthly income and satisfaction with health care provided were factors that showed significant association with activation at a value of $P \leq 0.05$ (Table 6).

After adjusting for the effects of other independent variables in the model, the odds of patients with no formal education having high activation was 73.8% less than patients with higher education (AOR=0.262 , 95% CI: 0.069 - 1.001). Similarly, the odds of patients with no monthly income having high activation level were 68.2% less when compared to patients having monthly income of >2500 ETB (AOR=0.318, 95% CI: 0.11 - 0.87). The other sociodemographic characteristics such as age, gender, marital status, and employment status were not found to have association with patient’s activation level.

Concerning clinical characteristics, patient activation had no association with the type of NCD patients presented with or whether they had comorbid NCD. Likewise, duration of illness wasn’t found to show association with having either low or high activation level.

Table 5. Bivariate relation between patient activation and patient characteristics/patient reported factor

	Characteristic	Patient Activation(n)		P value	Cramer’s V
		High	Low		
Age	18 - 54 years	173	33	0.024	0.142
	55 - 64 years	53	12		
	65 years and above	70	29		
Gender	Male	152	24	0.004	0.152
	Female	144	50		
Marital status	Single	70	11	0.003	0.192
	Married	188	42		
	Divorced/Separated	15	5		
	Widowed	23	16		
Educational background	Cannot read and write	41	17	<0.001 ^a	0.233
	No formal education	42	22		
	Primary school	83	19		
	Secondary school	66	11		
	Higher education	64	5		
Employment status	Unemployed	98	35	0.071	0.153
	Governmental employee	44	7		
	Private employee	28	2		
	Self-employed	87	23		
	Retired	39	7		
	No Income	105	42		

Monthly income	<2500 ETB	42	14	<0.001	0.211
	>2500 ETB	149	18		
NCD necessitating admission	Cancer	26	9	0.223	0.109
	Cardiovascular disease	199	50		
	Chronic Respiratory	16	7		
	Diabetes Mellitus	55	8		
Duration of illness	<1 year	51	14	0.724	0.060
	1-5 years	146	34		
	5-10 years	49	10		
	>10 years	50	16		
Comorbid NCD	No	142	40	0.349	0.049
	Yes	154	34		
BMI	Unknown	63	14	0.005 ^a	0.210
	<18.5	13	10		
	18.5-24.9	174	36		
	25.0-29.9	33	5		
	30 and above	13	9		
Satisfaction with health care	Satisfied	191	32	0.001	0.174
	Not satisfied	105	42		

^aFisher's exact significance level, n= number of participants

The multivariate logistic regression analysis also showed that patients who are satisfied with the health care provided have 2.3 more odds of having high activation level than those who were not satisfied with the health care provided (AOR= 2.34, 95% CI:1.32 - 4.15) (Table 6).

Table 6. Factors associated with patient activation

Variable	Category	Patient		COR with 95% CI	AOR with 95% CI	P value
		Activation (%)				
		High	Low			
Age	18 - 54 years	84	16	2.172 (1.227- 3.844)	1.227 (.519 - 2.898)	0.849
	55- 64 years	18.5	81.5	1.830 (.854 - .919)	1.191 (.495 - 2.864)	
	65 years and above	29.3	70.7	1	1	
Gender	Male	86.4	13.6	.455 (.266- .778)	1.616 (.873 - 2.990)	0.175
	Female	74.2	25.8	1	1	

Marital status	Single	86.4	13.6	4.427 (1.799- 10.896)	2.891 (.869 - 9.625)	0.056
	Married	81.7	18.3	3.114 (1.515 - 6.400)	2.377 (.962 - 5.874)	
	Divorced/Separa ted	75	25	2.087 (.631- 6.904)	1.586 (.400 - 6.280)	
	Widowed	59	41	1	1	
Educational background	Can not read and write	73.7	29.3	.188 (.065 - .550)	.357 (.091 - 1.394)	0.050
	No formal education	65.6	34.4	.149 (.052 - .425)	.262 (.069 - 1.001)	
	Primary school	81.4	18.6	.341 (.121 - .963)	.464 (.134 - 1.605)	
	Secondary school	85.7	14.3	.469(.154 - 1.425)	.582 (.163 - 2.080)	
	Higher education	93	7	1	1	
	Employment status	Unemployed	73.7	26.3	.503 (.206- 1.227)	
Governmental employee	86.3	13.7	1.128 (.363- 3.503)	.280 (.063 - 1.239)		
Private employee	93.3	6.7	2.513 (.485- 13.016)	.588 (.091 - 3.824)		
Self-employed	79.1	20.9	.679 (.269- 1.715)	.437 (.142 - 1.343)		
Retired	39	7	1	1		
Monthly income	No Income	71.4	28.6	.302 (.165- .554)	.318 (.115 - .877)	0.027
	<2500 ETB	75	25	.362 (.166- .789)	.508 (.206 - 1.252)	
	>2500 ETB	89.2	10.8	1	1	

NCD necessitating admission	Cancer	74.3	25.7	.420 (.146-1.213)	.381 (.119 - 1.218)	0.219
	Cardiovascular disease	79.9	20.1	.579 (.259-1.293)	.709 (.294 - 1.709)	
	Chronic Respiratory Disease	69.6	30.4	.332 (.105-1.057)	.716 (.195 - 2.627)	
	Diabetes Mellitus	87.3	12.7	1	1	
Satisfaction with health care provided	Satisfied	86	14	2.387 (1.422-4.007)	2.349 (1.328 - 4.155)	0.003
	Not satisfied	71.4	28.6	1	1	

*Hosmer and Lemeshow test significance value = 0.564, VIF = 1.01 – 1.70

6 Discussion

This study determined the status of patient-health care interaction in care plan as well associated factors among patients with NCD hospitalized in public hospitals in Addis Ababa, Ethiopia. Most of the patients had a good patient-health care interaction in care plan (activation level of 3 and 4). A patient's educational background, monthly income, and their satisfaction with the health care provided were found to be factors associated with achieving better activation levels.

More than 2/3 of the patients in the study have attained a high activation level with about 74% of the patients having an activation level of 3, i.e., patients were beginning to engage in recommended health behaviors. Similarly, four studies done among patients with atrial fibrillation, asthma, COPD, and a study inclusive of patients with different NCDs showed majority of the patients (>70%) had higher activation (29–31,37). The studies were carried out across different countries and included patients with different NCDs, however all patients were recruited from outpatient setups (Appendix 1). In contrary a community based cross-sectional study done in Nepal among COPD patients with comorbidities showed a significantly lower activation level with only 6.7% of the patients having high activation (level 3 and level 4) (41). A previous study done in Ethiopia among Diabetic patients also showed only 24% of patients were beginning to engage in recommended health behaviors and 1.5% of patients were proactive about health and engaged in most recommended health behaviors (level 4). When comparing the present study with the study previously done in Ethiopia, most of the patient's demographic characteristics were

similar. However, patients were recruited from the outpatient department in the previous study and though no data showing relationship of participation setup with activation is available, it might have contributed to the significant difference in PAM between the two studies.

Several patient characteristics were assessed for association with patient activation. On the Bivariate analysis age, gender, marital status, educational background, employment status, monthly income, and NCD type were significantly associated with patient activation at a P value of <0.25.

Findings of our study showed higher activation being significantly associated with younger age on the bivariate analysis. However, this association could not be proved by the multivariate analysis. Similarly, in a previous study done in Ethiopia, patients older than 50 years had 50% more odds of having lower activation which was significant only on bivariate analysis (24). Age was also found to be associated with patient activation in several other studies (26,31,38–40,45). Though age was associated with activation in the study done in Singapore, when adjusting for other variables, there was no significant association (45). Finding from studies done among Diabetic and COPD patients using multivariate analysis also showed significant association between activation and age where lower activation was associated with older age (27,42). Another study done in Diabetic patients in the Netherlands showed significant association on multivariate analysis between age and activation where older age was associated with lower activation but only in male patients (28). Association of gender with patient activation was significant in the present study with a P value of 0.04 on bivariate analysis. However, after adjusting for other variables, there was no significant association. Contrary to this finding, studies done in the Netherlands and USA among diabetic and atrial fibrillation patients, respectively, found that men are more activated than women (26,29). However, the study done across different countries involving COPD patients showed men are associated with having lower PAM (30). One study done in the Netherlands to specifically assess if there exists a difference in activation between men and women found out that there was no significant difference in activation between the two genders (28). Our study showed about 2/3 of patients with higher education were men and as higher education had significant association with better patient activation, the association of gender with activation during bivariate regression analysis might be explained with this factor however further study is needed as to why in some studies there is association while no association in other studies.

Another patient characteristic which had association with activation without controlling for other variables was marital status where in our study as well in a study done in USA being married or in a

committed relationship was associated with higher activation (29). Similarly in a study done involving prostatic cancer patients, unmarried patients had low PAM (46).

A patient's educational background was found to affect whether a patient will attain the necessary knowledge, skills, ability, and willingness to self-manage. In the present study, bivariate relations between patient activation and education showed significant association. Likewise, many of the studies reviewed were able to show this association (24,26,29,31,38–42,45). However after adjusting for other variables using a multivariate logistic regression model, only the current study and a few other studies were able to maintain a significant association (24,38,41). A study done in the Netherlands among patients having COPD/CHF/DM showed patients with low education level had poor activation compared to patients having moderate education level (AOR=1.41 95% CI: 1.03-1.92)(38). Poor activation (levels 1) was associated with having no education (AOR = 2.42, 95% CI: 1.09-5.38) and the authors theorized that poor patient- health care interaction occurs due to a chain effect that having no education has on getting better jobs which in turn creates an obstacle to make a good income (41) Health literacy, aside from ensuring patients understand health information, empowers patients, facilitates shared decision making, and increase adherence to treatment plan as well improve patient satisfaction (5,16,17). A study done in Nepal among COPD patients with comorbidities found significant associations between low health literacy level and education where four out of the five domains of health literacy assessed were significantly associated with education (41). A cross-sectional study done in USA among diabetic patients having HTN or ischemic heart disease found better clinical outcome (better HbA1c control) when the effect of FHL (functional health literacy) is combined with patient activation (43). In a study done among patients having atrial fibrillation with low activation have a lack of informed decision-making that is contributed by having low illness and treatment-related knowledge (35). Assessment of health literacy was beyond the scope of the present study, but the above findings support it as one important variable to be assessed in future studies.

More than 1/3 of the patients in the present study were unemployed and about 30% were self-employed. Prior to adjusting for other variable, the findings of this study as well as two other studies (29,46) showed an association between employment status and patient activation where patients with higher activation level were likely to have part time or full-time employment status (29) and unemployed patients had lowest activation (46). Similarly, another study found that those who were employed had 3 times the odds of having high activation level compared with those who were unemployed (95% CI 1.442-6.816) (32).

Monthly income of patients in our study was significantly associated with patient activation on the bivariate as well as multivariate analysis. Having no monthly income was associated with low activation (AOR=0.31, 95% CI: 0.11 - 0.87). 60% of the participants in the study that had no income were unable to read and write and 92.5% were unemployed. Finding of other studies also showed less financial satisfaction or having financial distress was associated with low activation (38,39). Contrary to this finding, monthly income had no significant association with activation levels in studies done in USA and Singapore (29,45). The researchers attributed the lack of association to be due to participant sampling where majority of the participants were of lower income level (45).

Among the clinical characteristics of patients in this study, duration of illness and comorbidity had no association with patient activation. Close to half of the patients had a duration of illness of 1-5 years and had comorbid NCD. In a study done among diabetic patients, having comorbidity had 2 times the odds of having lower activation than those with no comorbidity (24). Similarly, in a study done among COPD patients, having more than 2 comorbidities was associated with low activation (30). Contrarily, in a study done among COPD patients, having multiple comorbidities was associated with better activation. The authors assume the reason for such a contradictory finding as opposed to other study findings might be when a patient has several comorbidities then their experience with health care increases and as a result enables patients to deal better with their illnesses (42).

An important patient-reported factor assessed was patient satisfaction and about 65% of patients in the present study having high activation reported having a good experience with the health care provided. A statistically significant association was found between patient satisfaction and patient activation (AOR=2.349, 95% CI:1.328 - 4.155). Two other studies involving CHF and COPD patients, respectively, also support this finding where patients feeling less satisfied reported being less activated (30,39). Contrary to these, researchers found no significant association between satisfaction and activation in the study done in China among atrial fibrillation patients and suggested further studies to be carried out (35).

7 Implications of the study

Assessing the level of patient-health care interaction in care plan will help health care providers tailor recommended personalized care plan. As majority of the participants in this study have started engaging in recommended health behaviors, i.e., attained activation level 3, the focus of the providers will be on identifying associated factors and how to make patients be proactive about their health and maintain the

lifestyle changes already achieved as well as the recommended changes. and already achieved. In other words, guide providers tailor a personalized care plan.

In-patient setup often creates an intimidating environment for patients to effectively communicate and be involved in their care plan. However, the finding of this study showed better patient-health care interaction in the care plan and that patients were beginning to engage in recommended health behaviors. The study showed most patients were satisfied with the health care provided and that patient satisfaction was shown to have significant association with activation level. This highlights for hospital administrators and health care providers the significance of having high satisfaction with the care provided in improving patient-health care interaction in care plan. Findings from other studies also supported such findings (30,39).

Improving the income of patients with chronic disease will improve the patient-health care interaction in care plan. Most of the study participants with no monthly income were unemployed and illiterate and such key findings will guide the country's policy makers and stakeholders to focus on working in improving the education system as well as employment opportunities. However, as these factors are not easy to tackle in the short term, particularly in a poor nation like our country, health care providers will need to devise a systematic approach to focus on such groups.

8 Strength and limitation

Consideration of inclusion of patients with one or more of the main types of NCDs is believed to have improved generalizability of the findings unlike a previous study done in Ethiopia which considered only diabetic patients. Another strength of the study is sampling of patients from multiple health facilities thus improving generalizability. The study also followed a systematic random sampling approach which minimized sampling bias. Another strength of the study was inclusion of multiple variables in the analysis.

The limitation of the study would be, as data was collected using interviewer-administered questionnaire during in-patient care provision, patients might have been concerned that their care will be compromised if they gave their true response thus leading to a response bias. Another limitation of the study was including only secondary and tertiary care level health facilities, and the patient characteristics might differ when compared to primary care level facility. The study also used a cross-sectional design which limits the establishment of causal relationship between the dependent and independent variables.

9 Conclusions

The result of this facility-based cross-sectional study shows majority of the patients in the study were beginning to engage in recommended health behaviors with some patients already being proactive about their health and engaged in most recommended health behaviors thus showing a good patient-health care interaction with care plan. Several patient sociodemographic and clinical characteristics were found to be significantly associated with patient activation levels. However, only patient's educational background and monthly income were found to have significant association after adjusting for the effects of other independent variables. Patient satisfaction was an important patient-reported factor associated with patient activation where higher satisfaction with care provided is associated with higher activation. Recognizing determinants of patient activation will encourage health care providers to focus on tailoring a personalized care plan for their patients..

10 Recommendations

Health care providers should give importance to assessing their patient's level of interaction in care plans, identify possible hindering factors such as a patient's educational background and satisfaction with the quality of care they provide and tailor the care according to the patient's activation level thus creating a proactively engaged patient.

Hospital administrators should focus on assessing and improving the satisfaction of NCD patients during their stay in the hospitals as well devise a systematic way of monitoring how health care providers are effectively engaging patients in their care plan. By partnering with local and international organizations, the hospital's social services department should also be involved in the support of NCD patients identified as having financial challenges affecting their interaction in care plan.

Officials at higher levels such as the Ministry of Health should also develop policies that strengthen the integration of NCD patient-health care interaction in care plan aside from delivering health care.

Researchers should consider the limitation of this study and fill the gap by carrying out further studies such as longitudinal studies incorporating qualitative design to assess variables that showed association in the bivariate regression model and identify other confounding factors.

11 References

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12 Annex

Annex 1. Information sheet and consent form

Title of the research: Patient-health care interaction in care plan and its associated factors in public hospitals in Addis Ababa, Ethiopia: a facility-based cross-sectional study

Principal Investigator:

My name is Tigist Mesfin. I am a medical doctor and doing my master's degree in Clinical Trials at CDT-Africa; CHS, AAU. I am conducting research to assess the level of patient-healthcare interaction in care plan and associated factors among patients with chronic diseases in public hospitals in Addis Ababa.

Advisors: Anteneh Belete, BPharm, MSc, PhD, anteneh.belete@aau.edu.et; Agumasie Semahegn, MPH, PhD, PD Fellow, agumas04@gmail.com; Ruth Shimeles, MD, Assistant professor of Clinical Oncology, ruthshimelesa@gmail.com; Dejuma Yadeta (MD), Associate professor of Internal Medicine and Consultant Cardiologist, dejuya@yahoo.com

Sponsor: CDT-Africa; College of Health Sciences, Addis Ababa University, (CDT-Africa; CHS, AAU)

Purpose of the study: The purpose of the study is to assess the level of patient-healthcare interaction in care plan and associated factors among patients with chronic diseases receiving in-patient health services in public hospitals in Addis Ababa. You are kindly invited to participate in this study. Participation in this study is voluntary and you have the right to discontinue your participation at any time during the study. But the information that you are going to provide me is quite useful to understand the level of knowledge, skill and self-confidence patients with chronic disease have at managing their illness when faced with the need to receive care while admitted to a hospital and additionally it would help to give emphasis to any gap, if any, existing in patient-healthcare interaction in care plan and address it in collaboration with the responsible stakeholders.

Procedures to be followed: When participating in the study, you will be answering a paper study questionnaire. The questionnaire has four parts that will assess socio-demographic characteristics, clinical indicators, activation level and satisfaction with care provided. The data will be collected by trained data collectors through face-to face interview. It will be conducted in a place that is comfortable and maintains privacy as much as possible.

Duration: It is expected to take 20-30 minutes to complete the questionnaire.

Confidentiality: Only you and the data collector will be present during data collection unless you prefer a family member or caretaker to be present with you. The information you give will only be used for the research purpose and your identity will be kept anonymous.

Risks: your participation in this study will not pose any risk to you beyond those experienced in your everyday life.

Benefits: There will be no direct benefit to you, however your participation is likely to help me gather information on patients with chronic disease and their interaction with their healthcare plan while receiving health services in a hospital and associated factors such as their satisfaction with the care they receive. The information obtained from this study is believed to help health care providers tailor personalized health care plan which is a cornerstone in the prevention and management of chronic illness.

Right to Refuse or Withdraw: You do not have to take part in this research if you do not wish to do so, and you can also stop participating at any time during the study without losing any benefits to which you are otherwise entitled. If you wish to withdraw from the study before your participation is complete or before data analysis, your wish will be honored, and the information collected will be excluded from analysis.

Right to ask questions: If you have any questions, you may contact the principal investigator with the following address: Tigist Mesfin, MD, MSc fellow at CDT Africa; CHS, AAU Mobile- +251-911-74-53-74, Email-tigistmesfinmd@gmail.com

Consent Form

I have read the above information/ the information has been read for me and have agreed to be a part of this study. The general purpose of the study has been well explained to me and I was given the chance to ask questions. I understand that I am aware of my right to discontinue participation at any time during the study.

Participant's name

Signature

Date (DD/MM/YY)

Researcher's/Data collector's name

Signature

Date (DD/MM/YY)

Annex 2. Participants background information

Q.No.		Q.No.	
1.	Age (years)	6.	Monthly Income (ETB)
2.	Gender	7.	The NCD necessitating admission
	Male		
	Female	8.	Duration of illness (Years)
3.	Marital status	9.	Presence of comorbid NCD
	Single		Yes
	Married		No
	Divorced/Separated		If yes, specify.
	Widowed		
4.	Educational Background	10.	Body Mass Index (BMI) (refer from patient chart)
	Can't read/ write		<18.5
	No formal education		18.5–24.9
	Primary school		25.0–29.9
	Secondary school		30.0–34.9
	College/ university degree		35.0–39.9
	Postgraduate degree		> 40
5.	Occupational status		Not documented
	Unemployed		
	Governmental employee		
	Private employee		
	Self-employed		
	Retired		

Annex 3. Patient Activation Measure-22 (PAM-22)

No.		Strongly Disagree	Disagree	Agree	Strongly agree	Not applicable
Believes active role is important						
1.	When all is said and done, I am the person who is responsible for managing my health condition					
2.	Taking an active role in my own health care is the most important factor in determining my health and ability to function					
Confidence and Knowledge to take action						
3.	I know what each of my prescribed medications do					
4.	I am confident I can tell my health care provider concerns I have even when he/she does not ask					
5.	I am confident that I can tell when I need to go get medical care and when I can handle a health problem myself					
6.	I know the lifestyle changes like diet and exercise that are recommended for my health condition					
7.	I am confident that I can follow through on medical treatments I need to do at home					
8.	I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition					

9.	I am confident that I can find trustworthy sources of information about my health condition and my health choices					
10.	I am confident that I can follow through on medical recommendations my health care provider makes, such as changing my diet or doing regular exercise					
11.	I understand the nature and causes of my health condition(s)					
12.	I know the different medical treatment options available for my health condition					
Taking Action						
13.	I have been able to maintain the lifestyle changes for my health that I have made					
14.	I know how to prevent further problems with my health condition					
15.	I know about the self-treatments for my health condition					
16.	I have made the changes in my lifestyle like diet and exercise that are recommended for my health condition					
17.	I am confident I can figure out solutions when new situations or problems arise with my health condition					
18.	I am able to handle symptoms of my health condition on my own at home					
Staying the Course under stress						

19.	I am confident that I can maintain lifestyle changes like diet and exercise even during times of stress					
20.	I am able to handle problems of my health condition on my own at home					
21.	I am confident I can keep my health problems from interfering with the things I want to do					
22.	Maintaining the lifestyle changes that are recommended for my health condition is too hard to do on a daily basis					

Annex 4. Picker Patient Experience Questionnaire-15 (PPE-15)

No.	Questions	Response categories			
		Yes, always	Yes, sometimes	No	I had no need to ask
1.	When you had important questions to ask a doctor, did you get answers that you could understand?	Yes, always	Yes, sometimes	No	I had no need to ask
2.	When you had important questions to ask a nurse, did you get answers that you could understand?	Yes, always	Yes, sometimes	No	I had no need to ask
3.	Sometimes in a hospital, one doctor or nurse will say one thing, and another will say something quite different. Did this happen to you?	Yes, often	Yes, sometimes	No	
4.	If you had any anxieties or fears about your condition or treatment, did a doctor discuss them with you?	Yes, completely	Yes, to some extent	No	I didn't have any anxieties or fears
5.	Did doctors talk in front of you as if you weren't there?	Yes, often	Yes, sometimes	No	
6.	Did you want to be more involved in decisions made about your care and treatment?	Yes, definitely	Yes, to some extent	No	
7.	Overall, did you feel you were treated with respect and dignity while you were in hospital?	Yes, always	Yes, sometimes	No	

8.	If you had any anxieties or fears about your condition or treatment, did a nurse discuss them with you?		Yes, completely	Yes, to some extent	No	I didn't have any anxieties or fears
9.	Did you find someone on the hospital staff to talk to about your concerns?		Yes, definitely	Yes, to some extent	No	I had no concerns
10.	Were you ever in pain?	Yes				
		No				
	If yes ... Do you think the hospital staff did everything they could to help control your pain?		Yes, definitely	Yes, to some extent	No	
11.	If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?		Yes, definitely	Yes, to some extent	No	No family or friends were involved/ My family didn't want or need information/ I didn't want my family or friends to talk to a doctor
12.	Did the doctors or nurses give your family or someone close to you all the information they needed to help you recover?		Yes, definitely	Yes, to some extent	No	No family or friends were involved/ My family or friends didn't want or need information
13.	Did a member of staff explain the purpose of the medicines you were to take at home in a way you could understand? I had no medicines/go to question 15/		Yes, completely	Yes, to some extent	No	I didn't need an explanation
14.	Did a member of staff tell you about medication side effects to watch for when you went home?		Yes, completely	Yes, to some extent	No	I didn't need an explanation
15.	Did someone tell you about danger signals regarding your illness or treatment to watch for after you went home?		Yes, completely	Yes, to some extent	No	

አባሪ 1. መረጃ እና የስምምነት ቅጽ

የጥናቱ ርዕስ : ታካሚ በጤና እንክብካቤ እቅዱ ላይ ያለው ተሳትፎ እና ተያያዥ ሁኔታዎች ፤ በአዲስ አበባ፣ ኢትዮጵያ ባሉ የመንግሥት ሆስፒታሎች ላይ የተመሰረተ ጥናት።

ዋና ተመርማሪ :-

እኔ ትዕግስት መስፍን የሕክምና ዶክተር ስሆን በሲዲቲ-አፍሪካ ጤ/ሳ/ኮ፣ አ/አ/ዩ በክሊኒካል ሙከራዎች የማስተርስ ዲግሪዬን እየሰራሁ እገኛለሁ። በአዲስ አበባ በሚገኙ የመንግሥት ሆስፒታሎች ውስጥ የሥር-ሰደድ በሽታ ታማሚዎች በጤና እንክብካቤ ዕቅዳቸው ላይ ያላቸውን የተሳትፎ ደረጃን እና ተያያዥ ሁኔታዎች ለመገምገም ጥናት እያደረግሁ ነው።

አማካሪዎች:- አንተነህ በለጠ፣ ቢ/ፋርም፣ ኤምኤስሲ፣ ፒኤችዲ፣ anteneh.belete@aau.edu.et ፤ አጉማሴ ሰማኸኝ፣ኤምፔኤች፣ ፒኤችዲ፣ ፒዲ ፊሎው፣ agumas04@gmail.com፤ ፋት ሸመልስ፣ ኤምዲ፣ የክሊኒካል አንኮሎጂ ረዳት ፕሮፌሰር ruthshimelesa@gmail.com፤ ደጃማ ያደታ፣ ኤምዲ፣ የውስጥ ደዌ ህክምና ረዳት ፕሮፌሰር፣ የልብ ህክምና ስፔሻሊስት፣ dejuya@yahoo.com

ስፖንሰር : ሲዲቲ-አፍሪካ; የጤና ሳይንስ ኮሌጅ፣ አዲስ አበባ ዩኒቨርሲቲ፣ (ሲዲቲ-አፍሪካ፣ ጤ/ሳ/ኮ፣ አ/አ/ዩ)

የጥናቱ ዓላማ:- የጥናቱ ዓላማ በአዲስ አበባ በሚገኙ የመንግሥት ሆስፒታሎች ውስጥ የጤና አገልግሎት እያገኙ ያሉ ሥር-ሰደድ በሽታ ያለባቸው ሕመማን በእንክብካቤ ዕቅዳቸው ውስጥ ያላቸውን ተሳትፎ ደረጃን እና ተያያዥ ሁኔታዎች ለመገምገም ነው። እርስዎም በዚህ ጥናት እንዲሳተፉ በአክብሮት ተጋብዘዋል። በዚህ ጥናት ውስጥ መሳተፍ በእርስዎ ፈቃደኝነት የሚወሰን ሲሆን በጥናቱ ወቅት በማንኛውም ጊዜ ተሳትፎዎን የማቋረጥ መብት አለዎት። ከተሳትፎዎ የሚኘው መረጃ ሥር-የሰደድ በሽታ ያለባቸው ታማሚዎች የትኝቶ-ህክምና አስፈላጊ ሆኖ ሆስፒታል በሚገቡ ወቅት በጤና አጠባበቅ ዙሪያ ያላቸውን የእውቀት፣ የክህሎት እንዲሁም በራስ የመተማመን ደረጃ ለመረዳት በጣም ጠቃሚ ነው። በተጨማሪም በጤና እንክብካቤ እቅድ ውስጥ የታካሚ ተሳትፎ ክፍተት ያለው ሆኖ ከተገኘ ለሚመለከታቸው ባለድርሻ አካላት ትኩረት እንዲሁም መፍትሄ ለማሰጠት ይረዳል ።

የሚከተሏቸው ሂደቶች : በጥናቱ ላይ በሚሳተፉበት ጊዜ የጥናት መጠይቁን ወረቀት የሚሞሉ ይሆናል። መጠይቁ ማህበረሰባዊና ሥነ-ሕዝብ ባህሪያትን, የጤና ሁኔታ አመልካቾችን, የጤና እንክብካቤ ተሳትፎ ደረጃን እና በተሰጠው እንክብካቤ ላይ ያለውን እርካታ የሚገመግሙ አራት ክፍሎች አሉት። መረጃው በሰለጠኑ የመረጃ ሰብሳቢዎች ፊት-ለፊት በሚደረግ ቃለ-መጠይቅ የሚሰበሰብ ሲሆን በተቻለ መጠን ምቹ በሆነ እና ግላዊነትን በሚጠብቅ ቦታ ይካሄዳል።

የሚፈጀው ጊዜ: መጠይቁን ለመሙላት ከ20-30 ደቂቃዎች እንደሚወስድ ይጠበቃል።

ምስጢራዊነት : በመረጃ አሰባሰብ ወቅት እርስዎ እና መረጃ ሰብሳቢው ብቻ የሚገኙ ሲሆን የቤተሰብ አባል ወይም ተንከባካቢ አብሮት እንዲገኝ የሚፈልጉ ከሆነ በእርስዎ ፈቃደኝነት የሚወሰን ይሆናል። የሚሰጡት መረጃ ለጥናቱ ዓላማ ብቻ የሚያገለግል ሲሆን ማንነትዎን ገላጭ መረጃ ሚስጥራዊነቱ እንደተጠበቀ የሚቆይ ይሆናል።

ጉዳት: መሳተፍዎ በእለት ተእለት ህይወትዎ ውስጥ ሊያጋጠሙዎት ከሚችሉ ክስትቶች በላይ የሆነ ምንም አይነት ጉዳት አያመጣብዎትም።

ጥቅማ ጥቅሞች : ጥናቱ ለእርስዎ ምንም ዓይነት ቀጥተኛ ጥቅም አይኖረውም፤ ነገር ግን የእርስዎ ተሳትፎ ሥር-ሰደድ በሽታ ያለባቸውን ታማሚዎች በሆስፒታል ውስጥ የጤና አገልግሎት በሚያገኙበት ወቅት በጤና እንክብካቤ እቅዳቸው ላይ ያላቸውን የተሳትፎ ደረጃ እና ተያያዥ ሁኔታዎች እንዲሁም በእንክብካቤው ስላላቸው እርካታ መረጃ እንድሰበስብ ሊረዳኝ ይችላል። ከዚህ ጥናት የሚገኘው መረጃ ለጤና ባለሙያዎች ሥር-ሰደድ በሽታን ለመከላከል እና ለመቆጣጠር እንዲሁም ትልቅ ሚና ባለው የታካሚ ጤና እንክብካቤ እቅድ አዘገጃጀት ላይ እንደሚረዳ ይታመናል።

አለመሳተፍ ወይም የማቋረጥ መብት : ፈቃደኛ ካልሆኑ በዚህ ጥናት መሳተፍ አይጠበቅብዎትም። በተጨማሪም ምንም ዓይነት ማግኘት የሚገባዎትን የጤና አገልግሎት ሳያጡ በማንኛውም ወቅት ተሳትፎዎን የማቋረጥ መብት አለዎት። ተሳትፎዎ ሳይጠናቀቅ ወይም ከመረጃ ትንተና በፊት ከጥናቱ ለመውጣት ቢፈልጉ በፍላጎትዎ መሰረት ከእርስዎ የተሰበሰበው መረጃ የጥናት ትንተናው ውስጥ የማይካተት ይሆናል።

ጥያቄዎችን የመጠየቅ መብት : ማንኛውም ዓይነት ጥያቄ ካለዎት ዋናውን ተመራማሪ በሚከተለው አድራሻ ማነጋገር ይችላሉ፡ ትዕግስት መስፍን፣ ኤምዲ፣ ኤምኤስሲ ፌሎው፣ ሲዲቲ-አፍሪካ፣ ጤ/ሳ/ኮ፣ አ/አ/ዩ፤ ስልክ ቁ. +251-911-74-53-74፣ [ኢ.ሜል-tigistmesfinmd@gmail.com](mailto:tigistmesfinmd@gmail.com)

የስምምነት ቅጽ

ከላይ ያለውን መረጃ አንብቤ/ ተነባልኝ የዚህ ጥናት አካል ለመሆን ተስማምቻለሁ። የጥናቱ አጠቃላይ ዓላማ በደንብ ተብራርቶልኝ ጥያቄዎችንም እንድጠይቅ እድል ተሰጥቶኛል። በጥናቱ ወቅት በማንኛውም ጊዜ ተሳትፎን የማቋረጥ መብቴን እንደማውቅ ተረድቻለሁ።

የተሳታፊው ስም	ፊርማ	ቀን (ቀን/ወ/ዓ.ም)
የተመራማሪ/መረጃ ሰብሳቢ ስም	ፊርማ	ቀን (ቀን/ወ/ዓ.ም)

አባሪ 2. የተሳታፊዎች መረጃ

ጥ.ቁ.		ጥ.ቁ.	
1.	እድሜ (በአመት)	6.	ወርሃዊ ገቢ (በብር)
2.	ጾታ	7.	ለተኝቶ ህክምና የዳረገው ስር-ሰደድ በሽታ
	ወንድ		
	ሴት		8.
3.	የጋብቻ ሁኔታ	9.	
	ያላገባ		አለ
	ያገባ		የለም
	የተፋታ/የተለያየ		አለ ከሆነ መልስዎ የበሽታውን አይነት ይግለጹ
ባለቤቱ በሞት የተለየ			
4.	የትምህርት ደረጃ	10.	የሰውነት ክብደት መጠን ደረጃ (ከታካሚው የህክምና ካርድ ላይ የሚወሰድ)
	ማንበብ/መጻፍ የማይችል		<18.5
	መደበኛ ትምህርት ያልወሰደ		18.5-24.9
	የመጀመሪያ ደረጃ ትምህርት የወሰደ		25.0-29.9
	ሁለተኛ ደረጃ ትምህርት የወሰደ		30.0-34.9
	ኮሌጅ / የኒቨርሲቲ ዲግሪ		35.0-39.9
የድህረ ምረቃ ዲግሪ	> 40		
5.	የሙያ ደረጃ		አልተገለጸም
	ሥራ አጥ		
	የመንግስት ተቋም ሰራተኛ		
	የግል ተቋም ሰራተኛ		
	በግል ተዳዳሪ		
	ጡረተኛ		

አባሪ 3. የታካሚ ንቁ ተሳታፊነት መለኪያ-22 (PAM-22)

ጥ.ቁ.		በይብልጥ አልስማማም	አልስማማም	እስማማለሁ	በይብልጥ እስማማለሁ	ተፈጻሚ የማይሆን
ንቁ ተሳትፎ ጠቃሚ እንደሆነ አምናለሁ						
1.	የጤና ሁኔታዬን የመከታተል ሀላፊነት ያለብኝ እኔ እንደሆንኩ አውቃለሁ።					
2.	በጤናዬ አጠባበቅ ላይ ንቁ ተሳትፎ ማድረግ ጤንነቴን እና የመስራት አቅሜን ለመወሰን በጣም አስፈላጊው ነው።					
ለመተግበር ያለኝ እምነት እና እውቀት						
3.	የታዘዙልኝ መድሃኒቶች እያንዳንዱ ያላቸውን አስተዋጽዖ አውቃለሁ።					
4.	ስጋቶች በሚኖሩኝ ወቅት የጤና ባለሞያው ባይጠይቀኝም እራሴ ማሳወቅ እንደምችል እርግጠኛ ነኝ።					
5.	የጤና ችግር ሲፈጠር መቼ መቋቋም እንደምችል እንዲሁም መቼ ወደ ህክምና መሄድ እንደሚያስፈልገኝ በእርግጠኛነት አውቃለሁ።					
6.	ለህመሜ የሚመከሩ እንደ አመጋገብ እና የአካል ብቃት እንቅስቃሴ ያሉ የአኗኗር ዘይቤ ለውጦችን አውቃለሁ።					
7.	በቤት ውስጥ ማድረግ ያለብኝን የሕክምና ዘዴዎች መከታተል እንደምችል እርግጠኛ ነኝ።					

8.	ከበሽታው ጋር ተያይዘው የሚከሰቱ ምልክቶችን ወይም ችግሮችን ለመከላከል ወይም ለመቀነስ የሚረዱ መፍትሄዎችን መከተል እንደምችል እርግጠኛ ነኝ።					
9.	ስለጤንነቱ ሁኔታ እና ስለ ጤና እንክብካቤ አማራጮች ታማኝ የመረጃ ምንጮች እንደሚገኝ እርግጠኛ ነኝ					
10.	የጤና ባለሙያ የሚሰጠኝን እንደ አመጋገብ መቀየር ወይም መደበኛ የአካል ብቃት እንቅስቃሴ ማድረግን የመሳሰሉ የህክምና ምክሮች መከተል እንደምችል እርግጠኛ ነኝ።					
11.	የበሽታዬን ተፈጥሮ እና መንስኤ መረዳት ችያለሁ።					
12.	ለበሽታዬ ህክምና የሚረዱ የተለያዩ የሕክምና አማራጮችን አውቃለሁ።					
መተግበር						
13.	ጤንነቱን ለመጠበቅ ያደረግኩትን የአኗኗር ዘይቤ ለውጥ ማስቀጠል ችያለሁ።					
14.	በጤንነቱ ሁኔታ ምክንያት ሊከሰቱ የሚችሉ ተጨማሪ ችግሮችን እንዴት መከላከል እንደምችል አውቃለሁ።					
15.	የጤናዬን ሁኔታ በእራሴ መከታተል እና መጠበቅ እንደምችል አውቃለሁ					
16.	ለጤንነቱ ሁኔታ የሚመከሩ እንደ አመጋገብ እና የአካል ብቃት እንቅስቃሴ ያሉ የአኗኗር ዘይቤ ለውጦችን አድርጌያለሁ					
17.	ከጤንነቱ ሁኔታ ጋር ተያይዞ አዳዲስ ክስተቶች ወይም ችግሮች ሲፈጠሩ መፍትሄዎችን ማግኘት እንደምችል እርግጠኛ ነኝ።					
18.	በጤንነቱ ሁኔታ ምክንያት ለሚከሰቱ የህመም ምልክቶች በራሴ በቤት ውስጥ መከታተል እችላለሁ።					
በውጥረት ጊዜ እየተገበርኩ ያለውን ማስቀጠል						

19.	በውጥረት ጊዜም ቢሆን እንደ አመጋገብ እና የአካል ብቃት እንቅስቃሴ ያሉ የአኗኗር ዘይቤ ለውጦችን መተግበር እንደምችል እርግጠኛ ነኝ።					
20.	በጤንነቴ ሁኔታ ምክንያት ለሚከሰቱ ተያያዥ ችግሮች በቤት ውስጥ በራሴ መከታተል እችላለሁ።					
21.	የጤናዬ ሁኔታ ማድረግ ከምፈልጋቸው ነገሮች እንደማያገደኝ እርግጠኛ ነኝ።					
22.	ለጤና ሁኔታዬ የሚመከሩትን የአኗኗር ዘይቤ ለውጦችን እለት ተለት መተግበር እጅግ ከባድ ነው።					

አባሪ 4. ፕክ የታካሚ ተሞክሮ መጠይቅ-15 (PPE-15)

ጥ. ቁ	ጥያቄዎች	የምላሽ ምድቦች			
		አዎ ፣ ሁል ጊዜ	አዎ አንዳንዴ	አይ	መጠየቅ አላስፈለገኝም።
1.	ሀኪም መጠየቅ ላስፈለግዎት ጥያቄዎች, እርስዎ ሊረዱት በሚችሉት መንገድ መልስ አግኝተዋል?	አዎ ፣ ሁል ጊዜ	አዎ አንዳንዴ	አይ	መጠየቅ አላስፈለገኝም።
2.	ነርስ መጠየቅ ላስፈለግዎት ጥያቄዎች, እርስዎ ሊረዱት በሚችሉት መንገድ መልስ አግኝተዋል?	አዎ ፣ ሁል ጊዜ	አዎ አንዳንዴ	አይ	መጠየቅ አላስፈለገኝም።
3.	አንዳንድ ጊዜ በሆስፒታል ውስጥ አንድ ሀኪም ወይም ነርስ ከተናገሩት መረጃ የተለያ ሌላ ሀኪም ወይም ነርስ ሲናገሩ ይስተዋላል, ይህ እርስዎን አጋጥሞታል?	አዎ ፣ ብዙ ጊዜ	አዎ አንዳንዴ	አይ	
4.	ስለ በሽታዎ ወይም ህክምናው ምንም አይነት ስጋት ወይም ፍራቻ ከነበርዎት, ሀኪም አወያይቶታል?	አዎ ፣ ሙሉ በሙሉ	አዎ፣ በተወሰነ ደረጃ	አይ	ምንም አይነት ስጋትም ሆነ ፍራቻ አልነበረኝም።
5.	ሀኪሞች በእርስዎ ፊት እርስዎ የሌሉ ይመስል ይወያዩ ነበር?	አዎ ፣ ብዙ ጊዜ	አዎ አንዳንዴ	አይ	
6.	በጤና እንክብካቤዎ እንዲሁም ህክምና ላይ በሚደረጉ ውሳኔዎች ላይ የበለጠ ተሳትፎ ማድረግ ፈልገው ነበር?	አዎ በእርግጠኝነት	አዎ፣ በተወሰነ ደረጃ	አይ	

7.	ሆስፒታል በነበርኩበት ወቅት የተሰጥኝ እንክብካቤ አክብሮት በተሞላበት ሁኔታ ነበር የሚል ስሜት ተሰምትዎታል?	አዎ ፣ ሁል ጊዜ	አዎ አንዳንዴ	አይ	
8.	ስለ በሽታዎ ወይም ህክምናው ምንም አይነት ስጋት ወይም ፍራቻ ከነበርዎት፣ ነርስ አወያይቶታል?	አዎ ፣ ሙሉ በሙሉ	አዎ፣ በተወሰነ ደረጃ	አይ	ምንም አይነት ስጋትም ሆነ ፍራቻ አልነበረኝም።
9.	ስላሳሰብዎት ጉዳይ የሚያወያዩት የሆስፒታሉ ባልደረባ አግኝተዋል?	አዎ በእርግጠኝነት	አዎ፣ በተወሰነ ደረጃ	አይ	ምንም ስጋት አልነበረኝም።
10.	የህመም ስሜት ነበረት?	አዎ			
	መልሶ አዎ ከሆነ ... የሆስፒታሉ ሰራተኞች የህመም ስሜትዎን ለመስታገስ የተቻላቸውን ሁሉ አድርገዋል ብለው ያስባሉ?	አዎ በእርግጠኝነት	አዎ፣ በተወሰነ ደረጃ	አይ	
11.	የእርስዎ ቤተሰብ ወይም የቅርብ ሰው ሐኪም ማነጋገር ቢፈልግ ይህን ለማድረግ በቂ ዕድል ነበራቸው?	አዎ በእርግጠኝነት	አዎ፣ በተወሰነ ደረጃ	አይ	ምንም ቤተሰብ ወይም ጓደኞች አልተሳተፉም
					ቤተሰቤ መረጃ አላስፈለገውም ወይም አልፈለገም
					ቤተሰቦቼ ወይም ጓደኞቼ ሐኪም ማነጋገር አልፈለጉም ነበር።
12.	ሀኪሞች ወይም ነርሶች ከህመም እዲያገግሙ የሚረዱ አስፈላጊ መረጃዎችን ለቤተሰብዎ ወይም ለርስዎ ቅርብ ለሆነ ሰው ሰጥተዋል?	አዎ በእርግጠኝነት	አዎ፣ በተወሰነ ደረጃ	አይ	ምንም ቤተሰብ ወይም ጓደኞች አልተሳተፉም
					ቤተሰቦቼ ወይም ጓደኞቼ መረጃ አላስፈለጋቸውም ወይም አልፈለጉም
13.	የህክምና ባለሙያ ወደ ቤት ሲሄዱ ሊወስዷቸው የሚገቡ መድሃኒቶችን ዓላማ በሚረዱት መንገድ አብራርተውሎታል? መልስዎ ምንም መድሃኒት አልነበረኝም ከሆነ ወደ ጥያቄ 15 ይሂዱ.	አዎ ፣ ሙሉ በሙሉ	አዎ፣ በተወሰነ ደረጃ	አይ	ማብራሪያ አላስፈለገኝም።
14.	ወደ ቤት ሲሄዱ ስለሚወስዱዎቸው መድሃኒቶች ሊከታትሉዎቸው የሚገቡ የጎንዮሽ ጉዳዮች የህክምና ባለሙያ ነግሮታል?	አዎ ፣ ሙሉ በሙሉ	አዎ፣ በተወሰነ ደረጃ	አይ	ማብራሪያ አላስፈለገኝም።
15.	ወደ ቤት ከሄዱ በኋላ ሊከታትሉዎቸው ስለሚገቡ የበሽታው ወይም ህክምናዎ አደገኛ ምልክቶች የህክምና ባለሙያ ነግሮዎታል?	አዎ ፣ ሙሉ በሙሉ	አዎ፣ በተወሰነ ደረጃ	አይ	

13 Appendices

Appendix 1. Study Characteristics of reviewed literatures

No.	Authors	Study Design	Response rate	Study setup	Country of study
1	Hendriks M, Rademakers J	Cross-sectional	37%	Outpatient	Netherland
2	Bos-Touwen I, Schuurmans M, Monninkhof EM, et al.	Cross-sectional	53%	Outpatient	Netherland
3	Assefa et al.	Cross-sectional	96.90%	Outpatient	Ethiopia
4	Zimbudzi E, Lo C, Ranasinha S, et al.	Cross-sectional	Not specified	Outpatient	Australia
5	Dunlay SM, Griffin JM, Redfie MM, Roger VL	Cohort	80.50%	Inpatient	USA
6	Erskine NA, Gandek B, Waring ME, et al.	Cohort	68.10%	Inpatient and Outpatient	USA
7	Hendriks, Steven H et al.	Cross-sectional	72.80%	Outpatient	Netherland
8	McCabe PJ, Stuart-Mullen LG, McLeod CJ, et al.	Cross-sectional	Not specified	Outpatient	USA
9	Huang LY, Lin YP, Glass GF Jr, Chan EY	Cross-sectional	72.60%	Outpatient	Singapore
10	Müllerová H, Landis SH, Aisanov Z, et al.	Population-based cross-sectional	Not specified	Outpatient	Brazil, France, Germany, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, UK, US
11	Tusa N, Kautiainen H, Elfving P, Sinikallio S, Mäntyselkä P	Secondary data from trial participants	80.00%	Outpatient	Finland

12	Yadav UN, Lloyd J, Hosseinzadeh H, Baral KP, Bhatta N, Harris MF	Community based Cross-sectional	Not specified	Community setting	Nepal
13	Korpershoek Y, Bos-Touwen ID, de Man-van Ginkel JM, Lammers JW, Schuurmans MJ, Trappenburg J	Cross-sectional	52%	Outpatient	Netherland
14	Bahrom NH, Ramli AS, Isa MR, et al.	Cross-sectional	84.10%	Outpatient	Malaysia
15	O'Malley D, Dewan AA, Ohman-Strickland PA, Gundersen DA, Miller SM, Hudson SV	Cross-sectional	60%	Outpatient	USA
16	Milo RB, Ramira A, Calero P, Georges JM, Pérez A, Connelly CD	Cross-sectional	Not specified	Outpatient	USA
17	Kanu C, Brown CM, Rascati K, Moczygemba LR, Mackert M, Wilfong L	Cross-sectional	90%	Outpatient	USA
18	Wang J, Wang Q, Bao Z, et al.	Cross-sectional	Not specified	Not specified	China
19	Woodard LD, Landrum CR, Amspoker AB, Ramsey D, Naik AD	Cross-sectional	50.40%	Outpatient	USA
20	Masterson Creber R, Chen T, Wei C, Lee CS	Cross-sectional	Not specified	Inpatient	USA
21	Young HN, Larson TL, Cox ED, Moreno MA, Thorpe JM, MacKinnon NJ	Cross-sectional	78%	Outpatient	USA
22	Sui W, Wan LH	Cross-sectional	93.70%	Outpatient	China

Appendix 2. Mean activation level and activation level distribution of reviewed literatures

No.	Authors	Type/s of NCD	PAM score (Mean \pm SD)	Activation level distribution
1	Hendriks M, Rademakers J	DM	57.4 \pm 14.3	Level 1=23%, Level 2=23%, Level 3=31%, Level 4= 24%
2	Bos-Touwen I, Schuurmans M, Monninkhof EM, et al.	DM, COPD, CHF	DM= 55.3 \pm 11.0, COPD = 54.7 \pm 10.4, CHF 53.6 \pm 11.2	Not specified
3	Assefa et al.	DM	Not specified	Level 1=27.8%, Level 2= 46.8%, Level 3= 23.9%, Level 4= 1.5%
4	Zimbudzi E, Lo C, Ranasinha S, et al.	DM with CKD	57.6 \pm 15.5	Level 1=22%, Level 2=23.6%, Level 3= 36.4%, Level 4=18%
5	Dunlay SM, Griffin JM, Redfield MM, Roger VL	CHF	*53.2, IQR 48.9-55.6	Level 1= 16.6%, Level 2= 40.4%, Level 3=40.1%, Level 4=3.0%
6	Erskine NA, Gandek B, Waring ME, et al.	ACS	Not specified	Level 1= 9.7%, Level 2= 40.3%, Level 3= 21.1%, Level 4= 28.9%
7	Hendriks, Steven H et al.	DM	*55.6 (IQR: 51.0–63.1) in men and *55.6 (IQR: 48.9–61.9) in women	Men- Level 1 =17.3%, Level2=22.9%, Level 3= 49.5%, Level 4= 10.3%; Women Level 1 = 17.7%, Level2= 25.2%, Level 3= 45.1, Level 4= 12.0%
8	McCabe PJ, Stuart-Mullen LG, McLeod CJ, et al.	Atrial fibrillation	67.8 \pm 19.2	Level 1=8.9%, Level 2= 7.3%, Level 3= 45.5%, Level 4= 38%
9	Huang LY, Lin YP, Glass GF Jr, Chan EY	HTN, DM, COPD Lipid disorders	58.8 \pm 15.0	Not specified
10	Müllerová H, Landis SH, Aisanov Z, et al.	COPD	66.75 \pm 17.90	Level 1= 15%, Level 2= 13%, Level 3= 22%, Level 4=51%
11	Tusa N, Kautiainen H, Elfving P, Sinikallio S, Mäntyselkä P	DM, IHD, HTN	69.9 \pm 15.7	Level 1 and Level 2= 13%, Level 3= 31%, Level 4= 56%
12	Yadav UN, Lloyd J, Hosseinzadeh H, Baral KP, Bhatta N, Harris MF	COPD with Comorbidities	34.18 \pm 14.20	Level 1 = 81.5%; Level 2=11.8%, Level 3= 5%, Level 4= 1.7%

13	Korpershoek Y, Bos-Touwen ID, de Man-van Ginkel JM, Lammers JW, Schuurmans MJ, Trappenburg J	COPD	54.7 ± 10.4	Level 1=22.8%, levels 2=29.7%, Level 3 =33.1%, Level 4=14.5%
14	Bahrom NH, Ramli AS, Isa MR, et al.	Metabolic syndrome	59.4 ±10.2	Level 1=13.62% Level 2=24.6%, Level 3=48.9%, Level 4 =12.9%
15	O'Malley D, Dewan AA, Ohman-Strickland PA, Gundersen DA, Miller SM, Hudson SV	Breast and Prostate cancer	Prostate Survivors=3.25 ± 0.38 Breast Survivor= 3.34 ± 0.37	Not specified
16	Milo RB, Ramira A, Calero P, Georges JM, Pérez A, Connelly CD	DM	58.8 ± 13.21	Level1= 13.6%, Level 2= 30.4%, Level 3= 39.3%, Level4= 16.8%
17	Kanu C, Brown CM, Rascati K, Moczygamba LR, Mackert M, Wilfong L	Breast cancer	65.9 ± 15.7	Level 1 and Level 2= 32%, Level 3 and Level 4=68%
18	Wang J, Wang Q, Bao Z, et al.	Atrial fibrillation	59.89 ± 11.13	Level 1= 4.7% Level 2= 34.7%, Level 3= 47.4%, Level 4= 13.2%
19	Woodard LD, Landrum CR, Amspoker AB, Ramsey D, Naik AD	DM with HTN, IHD	37.96 ± 6.44	Level 1 and Level 2= 55.2%, Level 3 and Level 4= 44.8%
20	Masterson Creber R, Chen T, Wei C, Lee CS	CHF	*55.6, IQR 51.0–72.5	Level 1=22%, Level 2= 14%, Level 3= 39% and Level 4=26%
21	Young HN, Larson TL, Cox ED, Moreno MA, Thorpe JM, MacKinnon NJ	Asthma	65.6 ± 12.3	Level 1= 8%, Level 2= 12%, Level 3= 33%, Level 4= 47%
22	Sui W, Wan LH	Stroke	51.56 ± 12.58	Level 1= 52.9%, Level 2= 13.5%, Level 3 =21.8%, Level 4= 11.8%

*Median activation score