Treatment Patterns Among Adults with Type 2 Diabetes Mellitus and Hypertension

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BACKGROUND

- HTN, among other risk factors, acts as an independent modifiable contributor to CVD in patients with diabetes[1]
- Current ADA and IDF standards of medical care aim to reduce the vascular complications of T2DM through control of glycemia and blood pressure[2, 3]
- ADA Standards of Medical Care in Diabetes guidelines state that patients with HTN (systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg) should receive pharmacologic therapy. Pharmacologic therapy for patients with diabetes and HTN should be with a regimen that includes either an ACE inhibitor or an ARB[2]
- Previous studies indicate that there is a low rate of medication initiation for HTN in patients with diabetes and elevated CVD risk factors (i.e., HTN and hyperlipidemia)[4, 5]

OBJECTIVES

- To evaluate the management and treatment patterns of adults with the concomitant conditions of T2DM and HTN
- To characterize the anti-diabetic and anti-hypertensive therapies that these individuals received

METHODS

Study Design

- Cross-sectional analysis among SHIELD respondents with T2DM and HTN
- **S**tudy to **H**elp **I**mprove **E**arly evaluation and management of risk factors **L**eading to **D**iabetes (SHIELD) is a 5-year population-based survey conducted to better understand the risk for the development of diabetes, as well as diabetes disease burden
  - Based upon a screening questionnaire mailed to 200,000 nationally representative households (TNS NFO Household Panel), responses for 211,097 adults from 127,420 households were obtained (64% response rate)
  - A baseline survey was sent to 22,001 selected individuals derived from the screening respondents. Since 2005, annual SHIELD surveys have captured self-reported information on health status, attitudes and behaviors, quality of life, and anthropometry from this representative sample of the US population
  - The 2009 survey collected information from 13,822 SHIELD respondents (70% response rate) to identify those with T2DM and HTN

Study Population

- Respondents were 18 years of age or older
- Self-reported diagnosis of T2DM was based on being "told by a doctor, nurse or other healthcare professional that you have type 2 diabetes"
- Respondents reported a diagnosis of HTN based on being told by a healthcare professional that they had high blood pressure or HTN
- Among the T2DM sample, respondents who self-reported a diagnosis of HTN were identified

METHODS (Continued)

Study Measures

- Respondents provided the name of each medication currently prescribed for them while referring to the medication labels. Anti-diabetic medications were classified into 3 major groups:
  - Oral anti-diabetic medications (OADs) either as monotherapy or combination oral therapy
  - Insulin therapy alone
  - Insulin + OADs
- Anti-hypertensive medications were classified as follows:
  - ACE inhibitors
  - ARBs
  - Combination products
  - Beta blockers
  - Vasodilators
  - Calcium channel blockers
  - Alpha blockers
  - Diuretics
  - Other or unspecified
- Comorbid conditions were self-reported based on survey questions of being told by a healthcare professional that they had the condition

Statistical Analyses

- Descriptive statistics were reported as mean and SD for continuous variables and percentage of respondents for categorical variables
- Subgroup analysis was conducted for those respondents who provided an HbA1c level and blood pressure level; approximately one-third of the T2DM respondents provided these measures

RESULTS

- In total, 2,957 respondents reported a diagnosis of T2DM in the 2009 SHIELD survey
- 73.8% (n = 2,183) of T2DM respondents had concomitant HTN

Table 1. Characteristics of T2DM respondents with concomitant HTN

Characteristic	T2DM + HTN (n = 2,183)
Age, years, mean (SD)	64.5 (11.2)
Men, %	38.3
White, %	71.2
Education, % with < some college	32.9
Income, % with <$30,000/year	42.1
Dyslipidemia, %	81.1
Heart disease/heart attack, %	26.0
Stroke/TIA, %	7.6
Total number of comorbid conditions (excluding T2DM and HTN), mean (SD)	4.9 (3.0)
Currently smoke, %	12.5

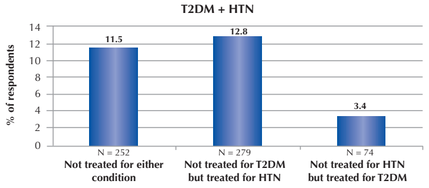
- The population with T2DM and HTN was composed largely of those of white race, women, and those with additional CVD risk factors, including dyslipidemia (Table 1)

RESULTS (Continued)

Treatment Patterns

No Treatment

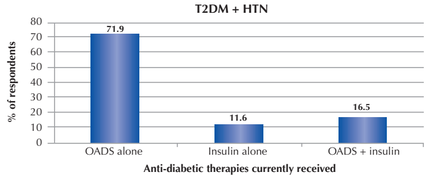
Figure 1. Proportion of T2DM + HTN respondents who were not treated with medication(s) at the time of the survey, n = 2,183



- 11.5% of respondents with T2DM + HTN were not currently treated for either condition (Figure 1)
- A total of 27.7% of respondents with T2DM + HTN were not receiving anti-diabetic medication and/or anti-hypertensive medication
- Among respondents with T2DM + HTN, there was a greater proportion of respondents not receiving treatment for T2DM (24.3%), compared with those not being treated for HTN (14.9%, p <0.001), indicating treatment inertia for T2DM

Anti-diabetic Therapies for Those Treated

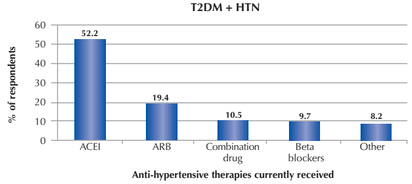
Figure 2. Proportion of T2DM + HTN respondents receiving anti-diabetic medication by category, n = 1,652



- Among treated respondents with T2DM + HTN, the majority (72%) were receiving OADs alone (Figure 2)

Anti-hypertensive Therapies for Those Treated

Figure 3. Proportion of T2DM + HTN respondents receiving anti-hypertensive medication by category, n = 1,857

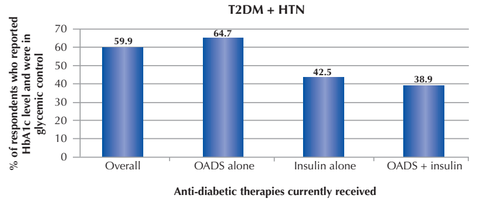


Other: 0.2% vasodilators, 3.8% calcium channel blockers, 0.3% alpha blockers, 3.7% diuretics, and 0.2% unspecified

- Of those treated respondents with T2DM + HTN, approximately half received an ACE inhibitor and an additional 19.4% received an ARB, which are recommended by the ADA Standards of Care (Figure 3)

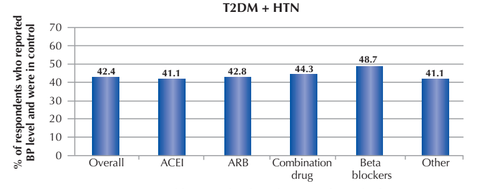
Subgroup Analysis of Disease Control

Figure 4. Proportion of respondents with T2DM + HTN who reported an HbA1c level and HbA1c <7% (glycemic control), n = 751



- Approximately 60% of respondents with T2DM + HTN who reported an HbA1c level indicated that they were in glycemic control (Figure 4)
- A greater proportion of respondents who received OADs alone had an HbA1c <7% (65%), compared with respondents who received insulin alone or OADs + insulin

Figure 5. Proportion of respondents with T2DM + HTN who reported BP level and were in control (SBP <130 mmHg and DBP <80 mmHg), n = 985



- Only 42% of respondents with T2DM + HTN who reported a BP level had their BP under control (systolic <130 mmHg and diastolic <80 mmHg)
- BP control was similar across the different classes of anti-hypertensive medications

LIMITATIONS

- Diagnosis of diabetes, HTN, and other comorbid conditions were self-reported and could not be validated with medical record review or administrative claims data. However, this bias is similar between the groups compared in this study
- Household panels, like the SHIELD study, tend to under-represent the very wealthy and very poor segments of the population and do not include military or institutionalized individuals

SUMMARY

- Hypertension is a common comorbid condition among respondents with T2DM
- Over 25% of respondents with T2DM and HTN remain untreated for one or both conditions
- Among respondents with T2DM and HTN, there is greater treatment inertia regarding initiation of treatment for T2DM (24.3% not treated), compared with treatment for HTN (14.9% not treated)
- Of those treated, most respondents received OADs alone (72%) for T2DM and ACE inhibitors or ARBs (72%) for HTN
- Among those whose HbA1c level was reported, more respondents who received OADs alone reported glycemic control than respondents who received insulin with or without OADs
- Among those who reported a BP level, the proportion of respondents with T2DM + HTN who had BP control was low (42%)

CONCLUSIONS

- With approximately 25% of respondents with T2DM + HTN not treated for T2DM, HTN, or both, there is a need for appropriate management of these high-risk conditions
- The greater treatment inertia (lack of drug treatment) for T2DM, compared with HTN, highlights the need for greater attention to glycemic control
- Treatment of T2DM and HTN should remain a priority to achieve better outcomes for this patient population

References

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List of Abbreviations

ACE/ACEI	Angiotensin-converting enzyme inhibitor	**OAD**	Oral anti-diabetic medication
ADA	American Diabetes Association	**SHIELD**	Study to Help Improve Early evaluation and management of risk factors Leading to Diabetes
ARB	Angiotensin II antagonist		
BP	Blood pressure	**SBP**	Systolic blood pressure
CVD	Cardiovascular disease	**T2DM**	Type 2 diabetes mellitus
DBP	Diastolic blood pressure	**TIA**	Transient ischemic attack
HTN	Hypertension	**TNS NFO**	Taylor Nelson Sofres National Family Opinion
IDF	International Diabetes Federation		

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