Missed Opportunity for Diagnosis of Heart Disease Prior to Symptomatic Stage: Results from the SHIELD Study

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space for abstract

BACKGROUND

- Approximately 15.8 million Americans have CHD[1]

- Many individuals go undiagnosed until the disease is in an advanced stage, often after experiencing a myocardial infarction[1]

- Comprehensive risk factor screening and follow-up by a primary care provider or other physician are generally recommended every 2 to 5 years for every adult, beginning at the age of 20[2,3]

- National efforts have been under way to promote CVD and CHD risk factor screening[4]

- It is unclear whether these promotion efforts and national guidelines have influenced how CHD is currently diagnosed

OBJECTIVE

- Assess whether screening for heart disease has increased over time or whether individuals are continuing to be diagnosed at later, symptomatic stages
  - Hypothesize that screening rates will be higher among respondents with heart disease and T2DM, a very high-risk group

METHODS

Study Design

- Cross-sectional analysis of the method of diagnosis and specialty of the physician diagnosing heart disease among SHIELD respondents at risk for CHD

- Data were derived from the **S**tudy to **H**elp **I**mprove **E**arly evaluation and management of risk factors **L**eading to **D**iabetes (SHIELD), a 5-year population-based survey conducted to better understand the risk and disease burden of diabetes and CVD

Study Population

- Respondents were categorized as having heart disease based upon self-report of having been told by a doctor, nurse or other healthcare professional that they have heart disease/heart attack, including the following:
  - Angina
  - Heart failure
  - Angioplasty
  - Heart bypass surgery

- Respondents with heart disease were stratified by presence of type 2 diabetes mellitus (T2DM), as T2DM is considered a CHD risk equivalent condition by NCEP ATP III guidelines

METHODS (Continued)

Study Measures

- Method of diagnosis of heart disease
  - Self-report of whether respondents were diagnosed:
    * During routine screening/laboratory work (blood test, etc.) ordered by their doctor
    * When tested for it after having some health symptoms
    * When being treated for another health problem
  - Respondents could check more than one method of diagnosis. Analyses included respondents who checked only one method

- Time since diagnosis of heart disease
  - Time since diagnosis = current age – age at diagnosis
  - Categorized into 3-year increments to capture changes before and after the guidelines on CHD screening and prevention[2] (published in 2001 and 2004)
  - Eight categories: 2004 or later, 2001–2003, 1998–2000, 1995–1997, 1992–1994, 1989–1991, 1986–1988, or 1985 or earlier

- Specialty of physician who made the diagnosis
  - Respondents indicated the specialty of the physician who made their diagnosis of heart disease:
    * Family doctor/general practitioner
    * Cardiologist
    * Endocrinologist
    * Neurologist
    * Other physician

STATISTICAL ANALYSES

- Comparisons between respondents with and without T2DM were made using chi-square tests for proportions and t-tests for comparisons of two means

- Statistical significance was set *a priori* at p <0.05

RESULTS

- A total of 1,573 respondents indicated a diagnosis of heart disease

Table 1. Characteristics of SHIELD respondents diagnosed with heart disease

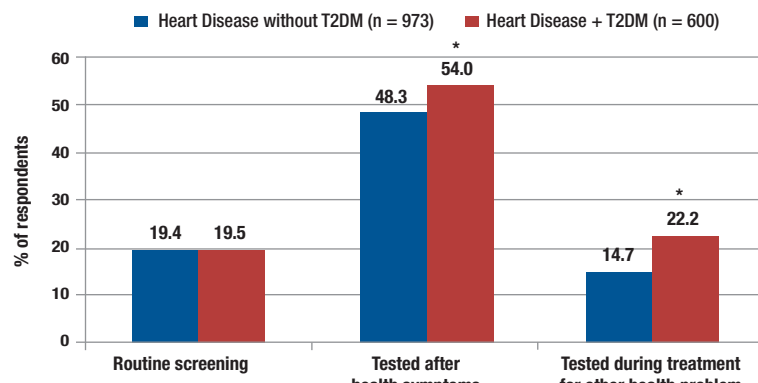| Characteristics	Heart disease without T2DM (n = 973)	Heart disease with T2DM (n = 600)
Age, years, mean (SD)	69.0 (11.5)*	67.0 (11.1)
Men, %	59.0*	49.3
Race, % white	91.3	87.8
Income, % with <$35,000	47.1	49.3
BMI category, % obese (BMI >30 kg/m²)	55.9*	62.5
Hypertension diagnosis, %	84.6	85.0
Dyslipidemia diagnosis, %	82.4	83.7
Current smoker, %	11.8	11.7

*p value <0.01 for comparison of with and without T2DM

- 38% of respondents with heart disease had T2DM

- Respondents with heart disease and T2DM were significantly younger (p < 0.001) and fewer were men (p < 0.001), compared with respondents with heart disease and no T2DM

- Significantly more respondents with heart disease and T2DM were obese than respondents with heart disease and no T2DM

RESULTS (Continued)
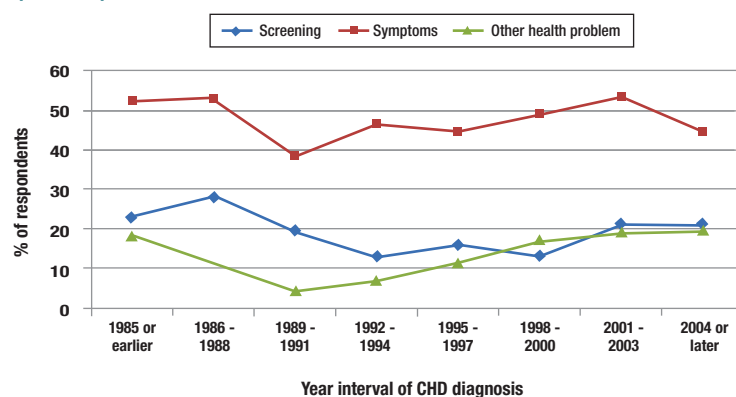
Method of Diagnosis

Figure 1. Method of diagnosis of heart disease

*p < 0.05 comparing no T2DM vs. T2DM; includes respondents who checked only one method of diagnosis

- Overall, 19% of individuals self-reported a heart disease diagnosis based on routine screening; 19.4% of individuals without T2DM self-reported a heart disease diagnosis based on routine screening, compared with 19.5% of the T2DM group (p = 0.99)

- Significantly greater proportion of heart disease respondents with T2DM reported the diagnosis based on having symptoms (54%), compared with respondents without T2DM (48%) (p = 0.03)

- In the non-T2DM group, 14.7% reported a diagnosis while being treated for another health problem, compared with 22.2% of the T2DM group (p < 0.001)
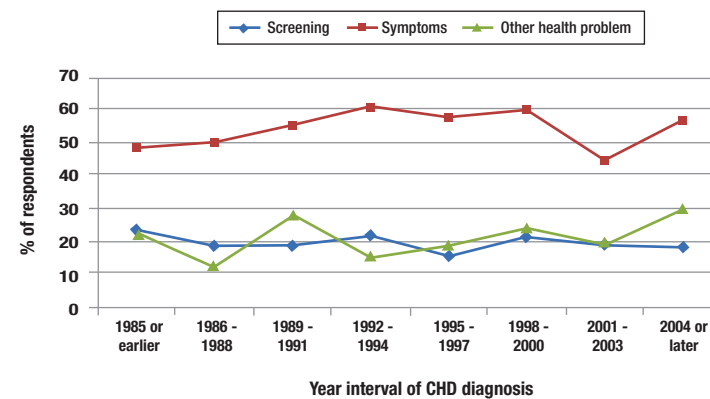
Figure 2. Method of diagnosis for respondents with heart disease and no T2DM (n = 973)*

*Respondents were permitted to check multiple responses

- The presence of symptoms contributed the greatest proportion to reported diagnosis of heart disease at all time intervals

- The proportion of respondents with heart disease and no T2DM reporting a diagnosis based on symptoms fluctuated over time

- The proportion of respondents reporting a diagnosis based on routine screening or while being tested during treatment for another health problem increased in recent years (1998 and later), but there was no significant trend over time (p > 0.05)
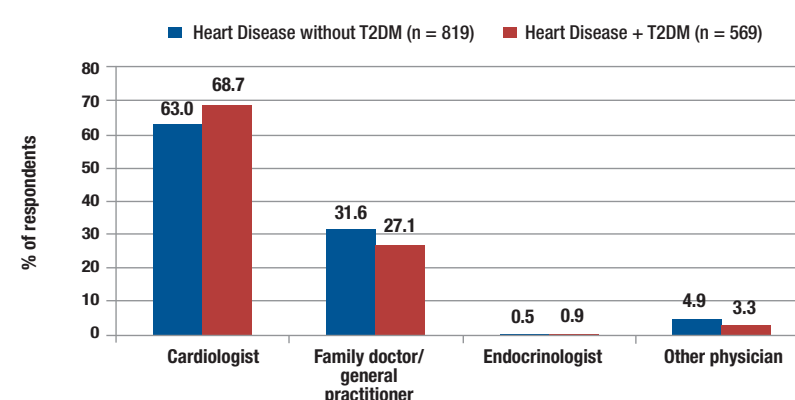
Figure 3. Method of diagnosis for individuals with heart disease and T2DM (n = 600)*

*Respondents were permitted to check multiple responses

- As with respondents without T2DM, the greatest proportion of diagnoses of heart disease in respondents with T2DM was due to symptoms
  - A greater proportion of respondents with T2DM reported the heart disease diagnosis based on having symptoms compared with respondents without T2DM (p = 0.03)

- For respondents with heart disease and T2DM, the proportion reporting a diagnosis based on symptoms increased from 1985 through 1994 and then dropped, but it increased again in recent years (2004 and later). This trend was not significant (p > 0.05)

- The percentage of respondents reporting routine screening or while being treated for another health problem as the method of diagnosis did not change over time (p > 0.05)

Figure 4. Specialty of physician who made the diagnosis of heart disease

- Majority of respondents with heart disease self-reported that they received their heart disease diagnosis from their cardiologist (63% in non-T2DM group and 69% in T2DM group)

- Approximately one third of respondents reported receiving their heart disease diagnosis from their family doctor or general practitioner

LIMITATIONS

- The determination of heart disease, method of diagnosis, age at diagnosis, and the physician specialty were made based upon self-report, without independent confirmation by the physician or examination of medical records

- 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

- Recall of clinical information by the respondent could potentially differ for recently diagnosed respondents compared with respondents given the diagnosis more than 10–15 years previously

SUMMARY

- This analysis showed that the diagnosis of heart disease is still largely based on symptoms; 48% to 54% of individuals with or without T2DM reported symptoms as the reason for the diagnosis of heart disease

- Symptoms-based diagnosis was reported more frequently in the T2DM group, which suggests that awareness of the need for routine screening for heart disease (e.g., risk factor screening) among individuals with diabetes is less than optimal

- There is some evidence that routine screening for heart disease is increasing in recent years among individuals without diabetes

- The small increase in the proportion of respondents with T2DM who reported their heart disease diagnosis occurred while being treated for another health problem may be related to their diabetes care and a good opportunity for identifying heart disease in this high-risk group

- The majority of respondents, regardless of whether they had T2DM or not, were diagnosed with heart disease by a cardiologist. It is probable that these respondents were referred to the cardiologist by their primary care physician for further evaluation, where the diagnosis was ultimately made

CONCLUSIONS

- Despite increased knowledge and awareness of the risk factors for CHD, many individuals are not diagnosed with heart disease until they are symptomatic

- Since only a small percentage of respondents were diagnosed through screening, there is a missed opportunity to diagnose heart disease during earlier, less severe stages of the disease

- There is a need for improved targeted education toward patients and physicians on reducing heart disease risk and identification of risk factors before symptoms occur

Abbreviations

CHD	Coronary heart disease
CVD	Cardiovascular disease
NCEP ATP III	National Cholesterol Education Program Adult Treatment Panel III
SHIELD	**S**tudy to **H**elp **I**mprove **E**arly evaluation and management of risk factors **L**eading to **D**iabetes
T2DM	Type 2 diabetes mellitus

References

1. AHA. Heart Disease and Stroke Statistics – 2007 Update. Dallas, TX
2. Pearson TA, et al. Circulation 2002;106:388-391
3. NHLBI and AHA. Recommendations regarding public screening for measuring blood cholesterol, 1995
4. MMWR 2005;54:865-870